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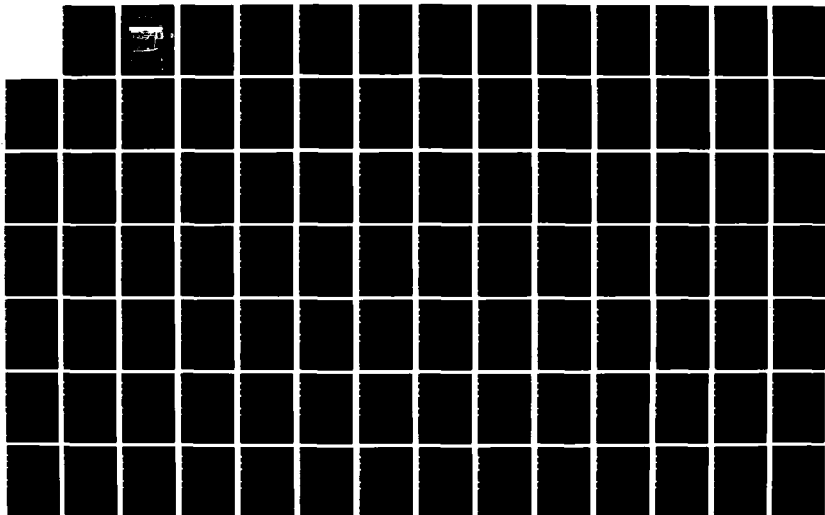
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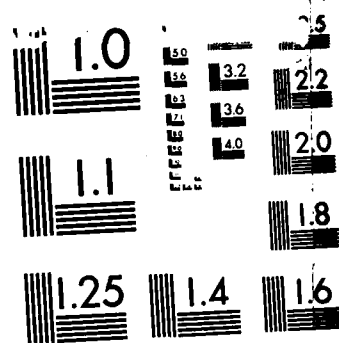
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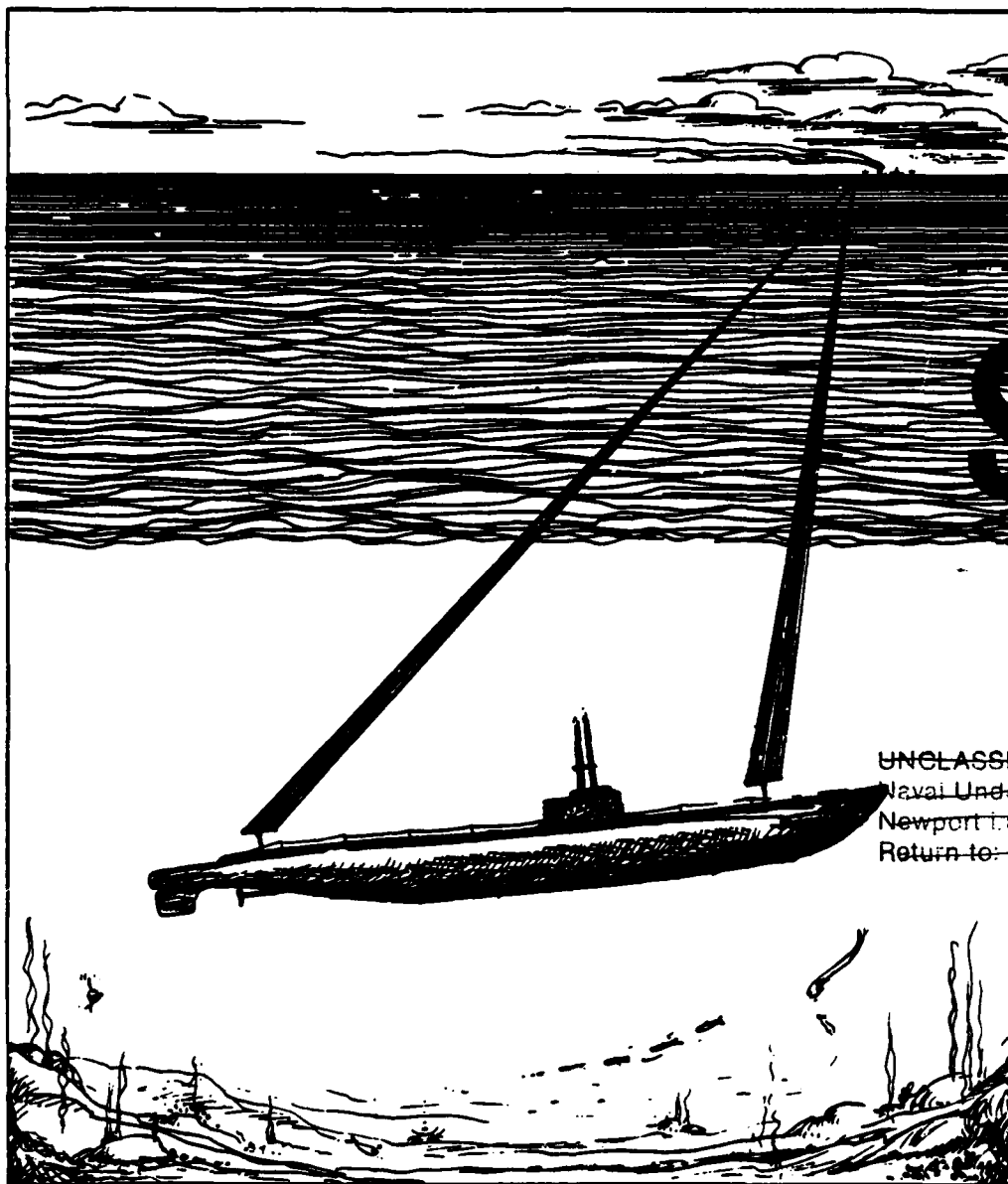
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Annotated Bibliography of Underwater Acoustic Research, 1942-1945:

Performed by Columbia and Harvard Universities at Fort Trumbull, CT
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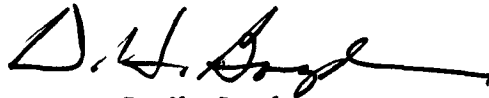
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PREFACE

This document was prepared as an in-house effort of the Naval Underwater Systems Center, Command Support Department.

The cover is an illustration representing Submarine triangulation from Columbia report D51/R1429 dated 29 May 1945.

REVIEWED AND APPROVED: 2 November 1983



D. H. Boyd
Head, Command Support Department

Inquiries concerning this document should be directed to the Naval Underwater Systems Center, Code 0213.

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AN ANNOTATED BIBLIOGRAPHY OF
UNDERWATER ACOUSTIC RESEARCH,
1942 - 1945: by
Columbia and Harvard Universities
at Fort Trumbull, CT (currently
the Naval Underwater Systems Center)

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New London, CT



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TABLE OF CONTENTS

	Page
INTRODUCTION	v
ABBREVIATIONS AND ACRONYMS	ix
ABSTRACTS	
Columbia University -- Division of War Research	1
Harvard University -- Underwater Sound Laboratory	261
Columbia University -- Division of War Research, Pearl Harbor Division	307
SUBJECT INDEX	315
AUTHOR INDEX	347
VESSEL INDEX	361

INTRODUCTION

During World War II, important research in underwater acoustics was performed by Columbia University--Division of War Research, at New London, CT, and Pearl Harbor, HI, and Harvard University's Underwater Sound Laboratory, New London, CT. This bibliography indexes and abstracts approximately 1400 reports pertaining to that research. These are represented by formal memoranda and operation, maintenance, and installation manuals, as well as by specifications. In addition, biweekly, monthly, comprehensive, interim, status, and progress reports are included.

The abstracts are arranged by accession number and are divided into three sections. Included are those prepared by (1) Columbia University--Division of War Research, at New London, CT (e.g., D16/R218-102); (2) Columbia University--Division of War Research, Pearl Harbor Division (e.g., G42/PHR76-1384); and (3) Harvard University--Underwater Sound Laboratory (e.g., H284-1301). A two-part numbering system has been used. The first part is the document number originally assigned by the authors, while the second part is an accession number assigned by the compilers. For example, in report "D16/R218-102," "D16/R218" is the document number, and "102" is the accession number.

Three methods of access to the collection are provided: (1) author; (2) subject; and (3) vessel.

Names of all authors of reports are arranged alphabetically in the Author Index. Under each name is a list of reports written by that particular author. Each report is referred to by both its document and accession numbers.

Author Index

FISH, P. E.]←Author

Document Number→[D16/R190]-[080]←Accession Number

The headings in the Subject Index are key words used by the author. A specific type of item (e.g., "JP Amplifiers") is listed under that item and modified (e.g., "Amplifiers--JP").

Subject Index

[Amplifiers--JP]←Subject Heading

Document Number→[D24/R618]-[459]←Accession Number

Some reports were indexes within themselves and can be located under the subject heading "Document Lists." The monthly and biweekly reports are periodic summaries of research and other activities. These are accessible under the subject heading "Reports -- Monthly & Biweekly."

Vessels on which equipment was installed and tests conducted, and which are mentioned in the abstracts, are indexed by the name of the vessel. Wherever possible the hull number and type of craft are included in the heading.

Vessel Index

Vessel Name→[USS CAIMAN (SS323)]←Vessel Number

Document Number→[P33/R1126]-[901]←Accession Number

Abbreviations and acronyms are expanded whenever possible. For example, "Expendable Radio Sono Buoy" is a subject heading but "ERSB" is not. There is a list of abbreviations and acronyms following this introduction that defines as many terms as possible. In a few cases, abbreviations and acronyms have not been expanded because of insufficient information.

It is hoped that this bibliography will be of value to scholars interested in underwater acoustic research during World War II.

ABBREVIATIONS AND ACRONYMS*

ADE: Audible Doppler enhancer	ASRB: Anchored sono radio buoy
AFC: Automatic frequency control	ATF: Automatic target following
AGC: Automatic gain control	ATT: Automatic target training
AMc: Coastal mine sweeper	AVC: Automatic volume control
AMPS: Acoustic marine pinging speedometer	AVP: Small seaplane tender
AN/ARR: A class of airborne radio receivers	AVS: Anchored-vessel screening
A/S: Anti-submarine	BDI: Bearing-deviation indicator
ASAP: Anti-submarine attack plotter	BIAT: Bearing indicator animated trainer
ASAT: Anti-submarine attack teacher	BT: Bathythermograph
ASW: Anti-submarine warfare	BuAer: Bureau of Aeronautics (later, Naval Air Systems Command)
ASWORG: Anti-submarine warfare Operations Research Group	BuOrd: Bureau of Ordnance
ASDEVLANT: Anti-submarine Development Detachment, Atlantic Fleet	BuShips: Bureau of Ships
ASDIC: Anti-submarine detecting investigation committee (actually a device rather than a group of persons (World War I)	BWI: British West Indies
	CG: Guided-missile cruiser
	CI: Cavitation indicator
	COAT: Conning-officer attack teacher
	COMAIRLANT: Commander, Air Force, Atlantic Fleet

*The following references were consulted during the preparation of this list: E. T. Crowley and R. C. Thomas, Acronyms and Initialisms, (3rd edition, Detroit, MI: Gale Research Co., c. 1970) and A Selected List of Acronyms, Initialisms, and Abbreviations for Use at the Naval Underwater Systems Center, comp. Myron S. Hoyt, revised by Dorothy E. Kennedy, U.S. Naval Underwater Systems Center, New London Laboratory, NUSC Technical Document 4565 (1974).

COMINCH: Commander-in-Chief (U. S. Fleet)	IES: Inductive echo simulator
COMSUBLANT: Commander, Submarine Force, Atlantic (Navy)	IRPL: Interservice Radio Propagation Laboratory
CR Sonar: Commutated-rotation sonar	IS-WAS: Animated trainer, attack course finder
CRO: Cathode-ray oscilloscope, or oscillograph	IS-WASAT: IS-WAS animated trainer
CUDWR: Columbia University, Division of War Research	IX: Unclassified miscellaneous
DCDI: Depth-charge direction indicator	JK: Type of sonar-listening system
DCG: Doppler-controlled gain	JP: Type of sonar-listening system
DCRE: Depth-charge range estimator	MAD: Magnetic airborne detector
DD: Destroyer	MITDIC: Massachusetts Institute of Technology, Division of Interior Communication
DE: Escort ship	MR: Medium range
DRAI: Dead-reckoning analyzer indicator	MTB: Maintenance of true bearing
DRSB: Directional radio sono-buoy	MUF: Maximum usable frequency
DRT: Dead-reckoning tracer	NAAS: Naval Auxiliary Air Station
DSS: Depth-scanning sonar	NAF: Naval Air Facility
EAR: Electronic aural responder	NAS: Naval Air Station
EAS: Electronic automatic search	N.D.: No date
EDI: Echo-Doppler indicator	NDRC: National Defense Research Center
ER: Electronic rotation	NLM: Noise-level monitor
ERB: Echo-ranging booster	NOL: Naval Ordnance Laboratory
ERSB: Expendable radio sono buoy	NRL: Naval Research Laboratory (ONR), also a type of bearing deviation indicator system
GTT: Generated-target tracking	
HUSL: Harvard Underwater Sound Laboratory	
ICS: Interior-communication system	

OAX: A type of portable underwater-sound testing equipment	PYc: Patrol vessel converted yacht (coastal)
OAY: Designation for a type of sound-measuring equipment	QBE: Designation for a type of echo-ranging and sound-listening equipment, c. 1941
ODN: Own-Doppler nullifier	QBF: Designation for a type of echo-ranging and sound-listening equipment, c. 1942
OSRD: Office of Scientific Research and Development	QBG: Designation for a type of sonic and supersonic listening equipment, c. 1943
OTE: Operator-training equipment	QC: Designation for a type of echo-ranging equipment, c. 1941
PAL: Phase-actuated locator (a type of bearing deviation indicator system)	QFD: A type of bearing teacher equipment
PAMS: Phase acoustic marine speedometer	QFF: A type of listening teacher equipment, c. 1943
PBM: Patrol bomber built by Martin (<u>M</u>)	QFL: Quasi-femi level (designator for a tactical range-recorder teacher, c. 1944)
PBY: Patrol bomber built by Consolidated (<u>Y</u>)	QH: Designator for a type of sonar
PC: Submarine chaser	RBAT: Relative-bearing animated trainer
PCO: Prospective commanding officer	RBV: Panoramic radio adapter, c. 1944
PE: Eagle boat	RCG: Reverberation-controlled gain (a type of radio receiver, c. 1943)
PPCR: Portable polar-chart recorder	
PPI: Plan-position indicator	
PRT: Portable radio telephone	
PTG: Projector-test gear	
PV-1: Patrol aircraft built by Lockheed-Vega Division, 1st model	
PY: Patrol vessel converted yacht	

RLI: Right-left indicator, (a type of bearing-deviation indicator system)	USCGC: United States Coast Guard Cutter
RSF: Reverberation-suppression filter	VBI: Vector-bearing indicator
SAMS: Steady-state acoustic marine speedometer	VILP: Vector-impedance locus plotter
SASAT: Shipboard anti-submarine attack teacher (Navy)	v.p.: various pagination
SC: Submarine chaser (110 ft.); or cruiser submarine	VTVM: Vacuum-tube voltmeter
SGM: Sound-gear monitor	WCA: Designation for a family of echo-listening sound equipment, c. 1941
SLC: Simultaneous-lobe comparison (a type of bearing deviation indicator system)	WEA: Wall-effect amplifier
SLCA: Simultaneous-lobe comparison for azimuth	WFA: Wide frequency antenna
SPTU: Split-test projector unit	WHOI: Woods Hole Oceanographic Institution
SS: Submarine	YNG: Gate craft (nonself-propelled)
STS: Submarine tactical systems	YP: Patrol craft (self-propelled)
TBM: Torpedo bomber built by General Motors	
TDI: Target-Doppler indicator	
TDM: Torpedo-detector modification	
TLR: Triangulation-listening-ranging	
TVG: Time-varied gain	
UCDWR: University of California, Division of War Research	

COLUMBIA UNIVERSITY
DIVISION OF WAR RESEARCH

ACCESSION NUMBERS

G12/R101-000

THROUGH

G34A/R1377-1193

G12/R101

GERJUOY, E. and MANINGER, R. C.

The measurement of the absolute efficiency of hydrophones.
Columbia Univ. - Div. of War Research
Dec. 4, 1942 22p.

This memorandum proposes an absolute efficiency differing slightly from Dietze's original definition. Dietze has defined the absolute efficiency of a hydrophone as the ratio in decibels of the maximum available signal power when the hydrophone is the reference field to 10⁻¹⁶ W. In the alternative definition, the resistive component and the frequency bandwidth are taken into consideration. A method has been developed, based on this alternative definition, for the rapid measurement of efficiency.

D20/R102

001

Modified receiving stack for standard equipment.
Columbia Univ. - Div. of War Research
Nov. 10, 1942 19p.

A modified receiving stack has been designed which can be substituted for the stack already in place. To convert to this stack, several functional elements will require little modification. The major equipment changes have to do with remote control of the projector training and with the method of determining range. The main purpose in changing this portion of the equipment is to provide for true-bearing training. A Sangamo chemical range recorder has replaced the present range indicator, while the present receiving amplifier is retained with almost no modification.

000

D20/R103

GILLET, G. D.

Immediate application of true-bearing training to amplidyne-equipped QC echo-ranging gear.
Columbia Univ. - Div. of War Research
N.D. 5p.

One of the major objectives in developing the present modified receiving stack for QC echo-ranging gear was the application of true-bearing training. In this training, the projector is automatically referenced to geographic north rather than to the ship's bearing. This objective could be met with only minor modification of the existing QC gear, which was equipped with amplidyne training control to effect true bearing training. The modifications require no additional equipment and could be made during an overnight stay of a ship in port. This report suggested that the change take place immediately as an interim step towards full conversion to the equipment of a modified receiving stack.

D20/R104

003

GILLET, G. D.

The application of bias to increase contrast on chemical recorders.
Columbia Univ. - Div. of War Research
Nov. 11, 1942 3p.

In connection with the adaptation of the chemical recorder as a range indicator for the modified QC receiving stack, it was found that the application of a negative bias to the stylus rectifier circuit of the chemical recorder greatly increased the control between the record of the echo and the unwanted record of background reverberation. This

increased contrast permits the detection and observation of echo traces that have previously been obscured by reverberation and also permits more accurate determination of the rate at which range is being closed on a target. Only a circuit modification is required to make this bias and it is recommended that all ships equipped with chemical recorders install this bias immediately.

D16/R106 004
MASON, R. I. and CARPENTER, T. H.
Flashing light on expendable
radio sono buoy.
Columbia Univ. - Div. of War
Research
Nov. 18, 1942 3p.

This memorandum details experiments conducted to determine the feasibility of using a flashing incandescent lamp on the expendable radio sono buoy, operating from the existing "B" battery. A proposal was made to charge a condenser at less than 5 mils (average) drain on the battery. The charging resistor was to be a relay coil that would release when the current fell to 2 mils and discharge the condenser through the lamp once per second. As a result of the experiments, a recommendation was made to abandon the idea.

D16/D34/R107 005
SNOW, W. B. and NEFF, W. D.
Effects of airplane noise on
listening with headphones.
Columbia Univ. - Div. of War
Research
Jan. 25, 1943 28p.

Experiments were conducted to answer questions resulting from the use of radio equipment on aircraft. The problems arising are not encountered in the usual

listening in boats or shore stations. The first problem is determining what hearing deficiency results from exposure to plane noise. Second is what effect long exposure to plane noise has on the operator's ability to detect the signal. Thirdly, what type of headphone most effectively attenuates ambient noise while passing the desired signal. Finally, what degree of masking takes place at different frequencies. This report answers these questions, and graphs detailing the results are included.

D10/R108 006
BREEZE, G. E.; MARTIN, G. W.; and
NOYES, E. E.
Projectile fuzes.
Columbia Univ. - Div. of War
Research
Dec. 28, 1942 41p.

Due to the development of a fast-sinking projectile, it became necessary to obtain knowledge of the shape and weight of the fuzes that were to make up the proposed projectile. This report details the objectives and design requirements of the projectile and then presents the development and operation of a 6-40 contact fuze and the 7-40 balanced magnetic-bridge fuze. Photographs and diagrams of the fuzes are included.

D12/R109 007
PROUDFOOT, D. A.
Summary of the extended
harbor-survey program.
Columbia Univ. - Div. of War
Research
Nov. 23, 1942 10p.

This memorandum is a summary of an extended harbor-survey program to be undertaken by the New London Laboratory in cooperation with the

Navy and the Woods Hole Oceanographic Institution. The purpose of the program, the information desired, the procedure during operations, and equipment required are broadly outlined as developed at a conference held in November 1944. Included is a listing of those who attended the conference.

D23/R110 008
CERNY, J. A.

Projectile rack for blimps.
Columbia Univ. - Div. of War
Research
Dec. 28, 1942 13p.

This report details the development of projectile racks for blimps. The rack is adaptable to both 6-40 and 7-40 type projectiles. Drawings and photographs of the rack are included.

D10/D29/R111 009
FULLERTON, D. P.

Fuze program, file D29, D10.
Columbia Univ. - Div. of War
Research
Nov. 26, 1942 3p.

This memorandum is a brief summary of the status of the fuze program as of November 26, 1942. The 6-40-C fuze, 7-40-M fuze, 6-40-DC fuze, 6-40-HIR fuze and 6-40-FCF fuze are covered.

G2/R112 010
Sound transmission tests at low and high frequencies Sept. 10 to Nov. 18, 1942.
Columbia Univ. - Div. of War
Research
Dec. 7, 1942 21p.

Transmission-loss measurements were made at low and high frequencies near New London and San Diego, both in shallow and deep

water. The deep-water measurements in the vicinity of San Diego indicated that, for frequencies of 1000 cycles or greater, the average transmission loss was approximately 6 dB per distance double. For low frequencies, of approximately 200 cycles and lower, the average transmission loss measured was 11 dB per distance double. In shallow water, the high frequency transmission loss averaged 6 dB per distance double. The low frequency losses varied from 4 to 7 dB per distance double close to the sound projector and from 4 to 45 dB per distance double at distances greater than 100 ft from the sound source. The maximum transmission losses in shallow water were attributable to reflections from a soft bottom combining with the direct and surface-reflected sound. The minimum transmission losses were measured over relatively hard-bottom courses. The character of the bottom appears to be more important than the depth in producing the large transmission losses observed.

R112.54 011

Methods used by IRPL for the prediction of ionosphere characteristics and maximum usable frequencies.
Nat'l Bureau of Standards -
Interservice Radio Propagation Lab.
Dec. 31, 1943 24p.

This paper describes the method used for long-time worldwide prediction of monthly average critical frequencies and maximum usable frequencies for the regular ionosphere layers. Tables are attached giving the necessary basic data for predicting, for the ionosphere observatories which have been operating long enough for their trends to be well-established.

R112.54 012

The prediction of usable frequencies over a path of short or medium length, including the effects of Es.

Nat'l Bureau of Standards -
Interservice Radio Propagation Lab.
Nov. 1, 1944 4p.

This report details the prediction of radio-propagation conditions over paths of various lengths. The effect of Es is included in the predictions of lengths. Tables are included that provide a step-by-step tabulation.

R112.54 013

An automatic instantaneous indicator of skip distance and MUF.
Nat'l Bureau of Standards -
Interservice Radio Propagation Lab.
Feb. 5, 1945 2p.

The purpose of this memorandum is to describe equipment that will give an instantaneous measure of the skip distance on any frequency or the MUF for any distance over any azimuth from a given station. The instrument proposed is a pulse transmitter of not less than 50-kW peak power, a rotating beam antenna for scanning, a receiver, and a PPI oscilloscope for either visual or photographic recording. Diagrams are included to provide more detail.

G1/R113 014
LOYE, D. P.

Deep- and shallow-water listening near Key West and San Diego during October 1942.
Columbia Univ. - Div. of War Research
Nov. 26, 1942 5p.

Listening tests conducted near Key West and San Diego indicate that sonic listening is as useful and practicable in deep as in shallow water. The depth of water ranged from 5 to 700 fm.

Destroyers, steam schooners, and PG boats were heard plainly in deep water over ranges varying from 6,000 to 26,000 yd. The tests done at Key West were largely in deep water and, for these observations, the topside-mounted listening equipment on submarines of the R-class was used. The listening tests near San Diego were made in shallow water using the overside JP listening equipment.

D12B/R115 015
WAGNER, R. A.

Chesapeake Bay cable-connected hydrophone system.
Columbia Univ. - Div. of War Research
N.D. 16p.

This report details the construction of a cable-connected hydrophone system at the entrance to Chesapeake Bay. The system consists of 14 hydrophones spaced at 3000-ft intervals approximately parallel to and about 1000 yd inside the magnetic loops. The hydrophones are mounted in steel-frame tripods and are connected to a common main cable which extends about 1 mile over land to the Harbor Entrance Control Post, where the switching gear and amplifier for the hydrophones and the recorders for the loops are located. Normally, automatic scanning of the hydrophones is employed, but provision is made for manual selection.

R115.5 016
SMITH, N.

A graphical method for calculating ground-reflection coefficients.
Nat'l Bureau of Standards -
Interservice Radio Propagation Lab.
June 1, 1945 9p.

This report contains many mathematical equations for calculating ground-reflection coefficients and direct conventions for electric and magnetic vectors.

D31/R116 017
ROCKWELL, G. O.
Underwater flare development.
Columbia Univ. - Div. of War
Research
Dec. 24, 1942 9p.

A test of underwater flares in August 1942 indicated that the performance of equipment was unsatisfactory for operational use, many of the flares having failed to burn. As a result of this, the New London Laboratory assumed responsibility for the experimental design of the underwater flare until a satisfactory unit was available for operational use. This report covers the redesign of the underwater flare.

G-1/R117 018
Operating instructions for underwater sound-level meter and analyzer.
Columbia Univ. - Div. of War
Research
Dec. 3, 1942 16p.

This step-by-step operating manual for the underwater sound-level meter and analyzer includes photographs of the equipment as well as diagrams and graphs of frequency cycles.

D10/R118 019
FULLERTON, D. P.
Fuze conferences held at New London Tuesday, December 18, 1942.
Columbia Univ. - Div. of War
Research
Dec. 18, 1942 5p.

This memorandum is an account of a conference called for the

purpose of discussing the general NDRC fuze problem. The possibilities of new solutions for existing fuze problems were discussed at length, along with new methods of development.

D12/R119 020
PROUDFOOT, D. A.
Harbor-survey transmitting ship requirements.
Columbia Univ. - Div. of War
Research
Dec. 3, 1942 4p.

Requirements for harbor-survey transmitting ships are presented in detail. The requirements cover general points, equipment, and space necessary for the equipment. Attached are drawings detailing the placement of equipment.

D20/R120 021
HORTON, J. W.
Further problems relating to echo-ranging equipment.
Columbia Univ. - Div. of War
Research
Oct. 31, 1942 8p.

The development of the modified receiving stack is given in this report. The new functional elements of major importance that are incorporated in this equipment are right-left bearing indications obtained by the use of lobe comparison, true-bearing training, the substitution of the Sangamo range recorder for the previously used range indicators, and the use of a cathode-ray oscilloscope for showing the echo pattern and time variation of gain to reduce the initial reverberation impact. The report concludes by listing the areas that will be taken under further consideration. These include directional stabilization, automatic training, and Doppler indication.

G1/R121 022
PROUDFOOT, D. A. and MANINGER, R. C.
Measurements of submarine sound
from USS GALAXY October and
November 1942.
Columbia Univ. - Div. of War
Research
N.D. 14p.

The purpose of this memorandum
is to record information regard-
ing the measuring equipment
and calibration procedure used
in connection with the program
of submarine-noise measure-
ments conducted from USS GALAXY
during October and November
1942. Block diagrams and graphs
are included.

D16/R122 023
NEFF, W. D. and BUMBAUGH, H. L.
Phonograph records for training
operators, expendable radio sono
buoy, Series D-16.
Columbia Univ. - Div. of War
Research
N.D. 23p.

Instructions on using
phonograph records for the training
of operators of the radio sono buoy
equipment are given. The report
lists material on each record and
can be used as a study guide to the
series.

D24/R123 024
Operation, use, and maintenance
of topside sonic-listening
equipment for submarines, Model
D-24, Mark II.
Columbia Univ. - Div. of War
Research
Dec. 10, 1942 34p.

The instructions in this report
cover the installation, operation,
and servicing of the Model D-24
sonic-listening equipment. The
equipment consists essentially of a
directional hydrophone and a
high-gain amplifier, provided with

various filter units and audible
and visual indicating devices.
Photographs, graphs of directional
patterns, diagrams, and plans
illustrate the report.

G20/R124 025
HORTON, J. W.
Anti-submarine warfare as
discussed at Halifax and Ottawa,
Canada, December 2 - 5, 1942.
Columbia Univ. - Div. of War
Research
Jan. 5, 1943 12p.

An account of the conference is
given in this report. Topics
discussed included defense
against small attack craft,
anti-submarine harbor defense;
cobar equipment, attack trainer,
high-frequency sounds on ships,
magnetic-loop gear, N.R.C. crystal
hydrophone, underwater lenses,
underwater noise maker, British
chemical-recorder quartz-projector
sounding unit, and miscellaneous
topics. A list of the people
attending the conference is
included.

D38/R125 026
SNOW, W. B.
Report of conference Dec. 9,
1942 on through-the-hull mounted
listening equipment.
Columbia Univ. - Div. of War
Research
Dec. 9, 1942 2p.

Preceding the conference, a
trip was taken for the purpose of
observing the operation of the
trial installation of
through-the-hull mounting. This
gear was compared with the overside
gear mounted on the same ship.
After this trip, a discussion was
held on the gear and specifications
were agreed on. A list of
conference participants is included.

D31/R127

027

Instructions for assembling underwater flares at Baldwin. Columbia Univ. - Div. of War Research
Dec. 8, 1942 2p.

Detailed instructions are given for assembling underwater flares.

G10/R129

028

GILLET, G. D.
Underwater electromagnetic detector. Columbia Univ. - Div. of War Research
Jan. 6, 1943 11p.

This memorandum details the installation of underwater electromagnetic devices and the negative results of the tests performed over the period of November 2 to November 6, 1942. Eight circuit sketches show the various circuits used during the testing of the device.

G27/R130

029

FOLLIN, J. W.
Comparison of piezoelectric and magnetostriction hydrophones for sonic listening. Columbia Univ. - Div. of War Research
Mar. 21, 1943 13p.

In listening to underwater sounds in the sonic-frequency range, it has been found desirable to employ broadband, nonresonant equipment. The choice of hydrophone for such equipment is an important factor, since it determines, among other things, the overall frequency response. Two types of electromechanical transducers, the magnetostrictive and the piezoelectric, match the characteristics of the water sufficiently well to give good output when used below resonance.

This memorandum suggests a basic figure-of-merit for such transducers, showing that, from this basic viewpoint, the two types have equal capabilities and pointing out the further considerations on which the choice of hydrophone should be based.

G27/R131

030

BERNIER, H. F.
Tubular magnetostriction hydrophone with cylindrical internal coil. Columbia Univ. - Div. of War Research
Dec. 18, 1942 6p.

A new type of magnetostriction hydrophone larger than the previous models has been developed for harbor-defense installation. This is a description of the hydrophone and includes figures graphically displaying the sensitivity, resistance, and reactance of the new hydrophone. A photograph is also included.

D23/R132

031

SHAFFER, W. G.
Electronic variable interval timer. Columbia Univ. - Div. of War Research
Dec. 23, 1942 9p.

The experimental electronic variable-interval timer described in this report was developed for use with the New London D101 bomb rack, to provide a means of automatically spacing a stick of bombs at various blimp ground speeds. The range over which this device is capable of giving the required 20-ft spacing between bombs is from 10 to 82 knots. Although a very wide range of bomb spacing and ground speed could have been provided to make the timer adaptable to airplanes, the

experimental unit was designed for blimp use only. A description of the timer is included, along with details of its operation. Performance characteristics are also given, as are photographs of the unit. Plans for the unit are included.

D10/R133 032
HOOPER, L. J.

Effect of nose shape on the performance at entrance of model underwater projectiles.
Columbia Univ. - Div. of War Research
Dec. 15, 1932 2p.

This memorandum is in response to comments made by the Royal Aircraft Establishment in regard to the effect of nose shape on the performance at entrance of model underwater projectiles. A study of these comments has shown that the Royal Aircraft Establishment has misunderstood the data presented in a memorandum on nose shapes. This misinterpretation is corrected in the memorandum.

D23/R135 033
ROCKWELL, G. E. and NOYES, E. E.

Electric-squib-actuated bomb-release latch.
Columbia Univ. - Div. of War Research
Dec. 23, 1942 11p.

In connection with the development of projectile and underwater flare dispensers for use in aircraft, the problem of obtaining a dependable, safe, and accurate release mechanism has been encountered. The electric-squib-actuated bomb-release latch has been developed to meet this objective. In experimental designs, a latch mechanism that supports the bomb-release cable is held in the

latched position by means of ball locks and a holding pin. An electric squib is located opposite the head of the pin and, when the squib is fired by an intervalometer, the pin is shifted to release the ball locks and latch. The explosion, together with the sudden release of potential energy stored in the stressed cable, actuates the latch instantaneously. Moving parts have been held to a minimum. Photographs of the latch are included.

D16/R136 034

Specification: Expendable Radio Sono Buoy, Mod D16-Mk IVD.
Columbia Univ. - Div. of War Research
N.D. 16p.

This specification covers the requirements for a sonic radio buoy containing a complete battery-operated radio transmitter of the frequency modulation type. Blueprints for the buoy are included.

D34/R137 035
FOX, R. A.

Progress report on redesign of transmitter for expendable radio sono buoy.
Columbia Univ. - Div. of War Research
Dec. 21, 1942 6p.

This progress report covers the redesign of a transmitter for expendable radio sono buoy. A summary of the work that has been done is included. Work has been done on the audio-frequency amplifier, radio-frequency operation, and the complete transmitter.

G1/R138 036
LOYE, D. P.

Tests of submarine listening equipment at Key West - December 7-12, 1942.
Columbia Univ. - Div. of War Research
Dec. 30, 1942 8p.

Tests were conducted to compare various types of sonic and supersonic listening equipments installed on R-class submarines operating from Key West, during the week of Dec. 7-12, 1942. The Navy, Naval Research Laboratory, and New London Laboratory personnel taking part in the tests are enumerated in appendix I. The equipment, together with the boats involved in the tests, was to determine the most satisfactory equipment for detecting auxiliaries of destroyers, or of boats of that type. The equipment tested has been used most extensively for listening to propeller and other noises of destroyers and other surface craft. Its use, however, for these tests was to determine its value in the detection of the auxiliaries of the Eagle Boat PE-55.

G17/R139 037
SEELEY, E. S.

Depth-angle measurement work at New London.
Columbia Univ. - Div. of War Research
Jan. 15, 1943 15p.

An account of depth-angle measurement work is given in this memorandum. Experiments were conducted to determine the method of measurement which would be the most satisfactory. The results of the experiments are presented in graph form.

D28/R140 038
KITTRIDGE, C. P.

Surface-craft dispensers for fast-sinking projectiles.
Columbia Univ. - Div. of War Research
Jan. 5, 1943 17p.

The purpose of this report is to describe the progress of developing equipment to launch or project fast-sinking anti-submarine projectiles from surface craft. Descriptions of dispensers for destroyers and small craft are given along with photographs of the dispensers. Under each description of a unit is given its development, calibration, and an alternative design for it.

D16/R141 039
Specification cylindrical magnetostriction hydrophone, Mod D-16 MK IV D
Columbia Univ. - Div. of War Research
Jan. 14, 1943 4p.

This specification covers the requirements for a cylindrical hydrophone of the magnetostrictive type equipped with an extension tube on which the attached cable may be coiled. This specification supersedes D16.6 4347, under which no hydrophones were constructed. Drawings showing the specifications are included.

D16/R143 040
CARPENTER, T. H.

Results of tests on soluble inserts for expendable radio sonobuoy.
Columbia Univ. - Div. of War Research
Jan. 7, 1943 3p.

This memorandum details the results of tests made at the New London Laboratory, January 1, 1943, to obtain design information on a

soluble insert for the expendable radio sono buoy that will dissolve under the normal action of sea water and sink the buoy at the end of the useful life of the transmitter batteries. The test requirements, insert-material tested, test apparatus, test procedure, and results are all given in some detail. The main conclusion drawn from the test was that a 3/4-in. deep insert of Carbowax 9000 at present represents the most perishable closure for the expendable radio sono buoy which will provide satisfactory protection to the transmitter over its present normal operating period under conditions tending to dissolve the insert at a maximum rate.

D16/R144 041

Installation and maintenance manual for Model D-16 Mark II radio receiving equipment for frequency-modulated signals, frequency range 67.2 to 72.2 MC. Columbia Univ. - Div. of War Research
Jan. 7, 1943 38p.

This manual describes the equipment, and discusses how the equipment is installed and maintained. Numerous photographs and diagrams of the equipment are included. Parts lists for each piece of equipment are given.

P12/R145 042

LOYE, D. P.
Binaural listening system.
Columbia Univ. - Div. of War Research
Jan. 12, 1943 9p.

The binaural system under development was first proposed for submarines to provide adequate topside listening in place of the SC tubes. Its applicability to overside and through-the-hull

patrol-craft listening and harbor protection also has been considered. After tests of many other types, both crystal and magnetostrictive, Brush crystal 4-ft line hydrophones were selected as most suitable for the purposes of this system. A feature of this system is the placement of the hydrophones at a slight angle out-of-line in a horizontal plane, to provide intensity as well as to phase binaural effects. Each hydrophone is made unidirectional by the use of a shield on the back side. The principal advantages of such a system over the GR 5 binaural system now in use for harbor protection are (1) the system is unidirectional instead of bidirectional, (2) intensity as well as phase binaural effects aid in the determination of accurate bearings, and (3) the system is relatively small and light.

D36/R146 043

NOYES, E. E. and SETTERHOLM, V. M.
Trials of pneumatic flare gun for blimps, at Lakehurst, NJ, December 22 and 23, 1942.
Columbia Univ. - Div. of War Research
Jan. 9, 1943 13p.

This report records statistical data and observations obtained during trials of a Model 118 flare gun for Mark V float flares. The trials were held at the Naval Air Station, Lakehurst, NJ, on December 22 and 23, 1942. The report details the purpose of the trials and personnel involved, and describes apparatus, installation, and trials. It concludes with tables listing blimp observations and ground data. One conclusion of the trials was that wind drifts are an important factor in the accuracy of placing flares and some allowance should be made for it if greater accuracy is desired. A second conclusion was that

propeller blast has a marked effect on the initial flight of the flare and the calibrations of the air-pressure gauge should be corrected to allow for this force.

D16/R147

044

Operation and use of the expendable radio sono buoy, Model D-16 Mark IV D transmitting equipment and Mark II receiving equipment.

Columbia Univ. - Div. of War Research
Jan. 20, 1943 16p.

This booklet describes the expendable radio sono buoy and gives instructions for its use. The expendable radio sono buoy is a device that requires no connecting wires between the hydrophone in the water and the sound operator. The sound picked up under water is broadcast from a floating miniature radio transmitter which is connected to the hydrophone. The sound operator, at a distance, can operate a radio-receiving set and hear all the sounds that reach the hydrophone. This device is suitable for use with aircraft, enabling a plane patrolling waters infested with submarines to hear noise occurring under the water. Photographs of the equipment are included.

D16/R148

045

Service manual for expendable radio sono buoy, Mod D-16 Mk IV D. Columbia Univ. - Div. of War Research
Jan. 20, 1943 23p.

This manual covers the Mk IV D buoy and includes amplified servicing instructions. Also covered in the manual are revisions. This is a complete service manual.

D16/R149

046

WAMBACH, A. G.

Sea markers (slicks, smokes, and flares).

Columbia Univ. - Div. of War Research

Feb. 12, 1943 3p.

Along with the development of the expendable radio sono buoy, it became necessary to find or develop a sea marker which would persist for a period of 30 min to 1 hr and which could be seen for a considerable distance from heights of 300 ft and up. In addition, it was desirable to have a marker which could be used at night, as well as in the daytime. This memorandum covers the developments that have been investigated. There are paragraphs describing the work being done by each company involved in the project.

D24/D38/R150

047

LOYE, D. P.

Crystal hydrophones conference with Mr. Massa, Friday, Jan. 8, 1943.

Columbia Univ. - Div. of War Research.

Jan. 19, 1943 4p.

A conference was held with Mr. Frank Massa, of the Brush Development Corporation, at the New London Laboratory, January 8, 1943, for the purpose of discussing modifications of the design of the 4-ft crystal hydrophone, Model C-37, to fulfill the requirements of through-the-hull patrol craft and topside submarine listening. The design features of the crystal hydrophone and the requirements of it are presented.

G1/R151 048
LOYE, D. P.

Sonic and supersonic listening tests on AMADA, January 16, 1943. Columbia Univ. - Div. of War Research
Feb. 12, 1943 7p.

The purpose of the tests was to compare listening to sonic and supersonic submarine noise using a magnetostrictive 3-ft line hydrophone and a Brush C-37-2 crystal hydrophone. This memorandum describes the tests and summarizes the results. The future plans for the hydrophone program are discussed.

D16/R152 049
SNOW, W. B.

Headphones for expendable radio sono buoy operators. Columbia Univ. - Div. of War Research
Jan. 21, 1943 4p.

The choice of proper headphones for listening in airplanes to expendable radio sono buoy output is the subject of this memorandum. One requirement in choosing headphones is that the frequency range be adequate. A second requirement to be considered is comfort and exclusion of noise. The third requirement is that the headphones be able to withstand temperatures ranging from -79 to 167°F. Ruggedness and headband construction are the fourth and fifth requirements, respectively. The final requirement is standard construction so the headphones can be easily connected to the plane's interphone system. The recommendations for headphone selection follow the explanation of the requirements in choosing them.

D22/D24/R153 050
GARDNER, J. B.

Tolerance specification for resistors and condensers for NL-102, NL-105 amplifiers. Columbia Univ. - Div. of War Research
Feb. 21, 1943 3p.

Tests were made on two identical filter units constructed at the New London Laboratory using standard commercially available resistors and condensers of 10 percent tolerance for resistors and 20 percent for condensers. The results of the tests are given in a graph and a diagram.

D38/R155 052
TEAL, E. E.

Through-the-hull sonic listening equipment. Columbia Univ. - Div. of War Research
Apr. 22, 1943 22p.

To establish the design for a production model of through-the-hull type sonic listening gear for motor sailers, an experimental unit was made and installed for test at the New London Laboratory in CGR 1985, which already had the JP listening equipment. It was found possible to listen when under sail at 3 or 4 knots almost as well as when drifting in a 15-mph wind, or under conditions of rolling and pitching. A principal feature of installation was the use of a straight wood-core hydrophone 2 in. in diameter and 3-ft long equipped with an air-filled streamlined baffle which provided good front-to-back discrimination with minimum drag. This hydrophone and baffle assembly proved to have better acoustical and mechanical features for the application than the 2-ft toroidal hydrophone and baffle assembly used on the overside gear. Other types of

acceptable hydrophones, whether crystal or straight toroidally wound magnetostrictive, of the specified dimensions can be used if desired. The depth below the hull at which listening should be done was established by careful measurements and a simple design for the supporting and training gear was developed. This equipment is readily adapted for use on many types of small patrol craft.

D16/R156 053
NEFF, W. D.

Desirable characteristics for expendable radio sono buoy system. Columbia Univ. - Div. of War Research
Jan. 28, 1943 11p.

The most desirable frequency characteristic for the radio sono buoy system depends on the acoustic spectrum of the submarine sounds and general water noise, and the ability of the sound operator to hear the various component frequencies of the submarine sounds in the presence of the masking noise of an airplane. This memorandum covers experiments performed to try to determine the best frequency characteristics for the radio sonic buoy and the results are given in tables.

D16/R160 054

Specification for Expendable Radio Sono Buoy, Mod D16 Mk IV E. Columbia Univ. - Div. of War Research
N.D. v.p.

This specification covers the requirements for radio sono buoys containing a complete battery-operated radio transmitter of the frequency-modulation type. The radio transmitter has a power output of approximately 1/3 W. Blueprints are included.

G12/R158 055
THURAS, A. L.

Development of magnetostrictive hydrophones July 1, 1942 to April 1, 1943. Columbia Univ. - Div. of War Research
N.D. 28p.

The work discussed in this report is a continuation of that which resulted in the toroidal and straight hydrophones of the magnetostrictive type, the first of which has found extensive use in overside listening equipment for small surface-patrol craft and, more recently, has been incorporated in topside-listening equipment for submarines. Developmental work has continued on four types of hydrophones. Work is also continuing on development of a baffle for use with various types of hydrophones. Directional patterns of the various units are described and a section is devoted to the proposed experimental use of a film of air-filled rubber on the hull of the ship to reduce noise transmission by the hull.

D16/R161 056

Specification for cylindrical magnetostrictive hydrophone, Mod D-16 Mk IV E. Columbia Univ. - Div. of War Research
N.D. 8p.

This specification covers the requirements for a cylindrical hydrophone of the magnetostrictive type equipped with an extension tube on which the attached cable may be coiled. This hydrophone was designed for better adaptation to quantity production than the D16/R141 hydrophone, for which it can be substituted.

D24/D38/R162 057
Specification for
sonic-listening amplifier, Model NL
105.
Columbia Univ. - Div. of War
Research
Mar. 23, 1943 37p.

This specification and
associated drawings cover the
engineering requirements for a
sonic-listening amplifier for use
with hydrophones. The amplifier
covered by this specification
consists of four high-gain
resistance-coupled stages and a
push-pull output stage. A voltage
amplifier and rectifier is also
included to operate an electron ray
(magic-eye) indicator tube.

D29/R163 058
HOOPER, L. J.
Drop tests of 7-40-M fuze.
Columbia Univ. - Div. of War
Research
Feb. 26, 1943 9p.

A series of drop tests were
made at the New London Laboratory
to determine the effect on a 7-40-M
fuze when dropped from heights
ranging from 0.5 to 5.0 ft. Three
fuze orientations during fall were
used in the tests: (1) nose-on,
(2) fuze axis and magnetic axis
horizontal, and (3) fuze axis
horizontal and magnetic axis
vertical. The same two fuze
assemblies were used for all of the
48 tests. No significant damage
was caused to the fuze assemblies
in the tests.

D16/R164 059
RIPKEN, J. F.
Suggested use of the
chemical-bomb case for the
expendable radio sono buoy.
Columbia Univ. - Div. of War
Research
Feb. 17, 1943 3p.

A large supply of unused Army
30-1b M-46A1 and M-46A2
chemical-bomb cases are available
for use for purposes other than the
original. It has been suggested
that these might be employed as
containers for the expendable radio
sono buoy. Consideration has been
given to this suggestion and some
procedures have been carried out to
determine the data supplied in this
memorandum. The advantages to
using the cases and the
disadvantages are listed. The
disadvantages outweigh the
advantages, so further work was not
warranted.

G10/R165 060
PROUDFOOT, D. A.
Determination of running depth
of test torpedoes by a sonic method.
Columbia Univ. - Div. of War
Research
Feb. 18, 1943 3p.

This memorandum reports tests
made to investigate the feasibility
of measuring the depths of
torpedoes by sonic means. Tests
have indicated that this method is
very useful and more work will be
done using this method.

G12/R166 061
GERJUOY, E. and MANINGER, R. C.
The measurement of the working
absolute efficiency of hydrophones.
Columbia Univ. - Div. of War
Research
Feb. 18, 1943 23p.

This report covers a method of
rapidly measuring the "working
absolute efficiency" of
hydrophones, especially of
instruments, including an internal
amplifier (preamplifier), where the
terminals of the sound-responsive
unit itself are not readily
accessible for impedance
measurements. This memorandum is
consistent with the method of

rating hydrophones proposed by E. Dietze, but the results of the measurements outlined herein may, under certain conditions, differ slightly from those that would be obtained by a more rigorous application of the original definition of absolute efficiency. To distinguish between the two, the name "working absolute efficiency" is suggested for application to all results obtained by this measuring method.

D16/R167 062
MACLAUGHLIN, R. R.

Attempt to make comparison tests of standard Mark IV D (serial 5) TMS-30 and B-15 hydrophones in noisy water.
Columbia Univ. - Div. of War Research
Feb. 17, 1943 6p.

In connection with studies done to improve the hydrophones associated with the expendable radio sono buoy, two newly developed types have been tested. The first new type is a spool-wound hydrophone which is similar to the standard Mark IV D hydrophone except that it contains a wood core between the laminations and windings are held in close proximity to the nickel shell. In addition, nickel end caps are employed to utilize the end flux. The second new type is the toroidally wound hydrophone. The winding in this type is wound directly on the nickel shell so that the shell forms a closed and self-contained magnetic circuit. There are no end caps or laminations utilized. Tests were conducted on both types and calibration curves are included.

D20/R168 063
NDRC Mark II indicator-amplifier-control unit of Models QCJ-3, QCL-1, and QCL-2 echo-ranging equipment.
Columbia Univ. - Div. of War Research
Feb. 1943 v.p.

The indicator-amplifier-control unit described in this book is designed to replace the Submarine Signal Company's indicator-amplifier-control unit No. 583AE or 583AF normally furnished with Model QCJ and QCL equipments. Figure 1.1 shows the NDRC unit and the standard unit which it replaces. The book is illustrated with many photographs and drawings of the equipment. Blueprints are included.

D42/R169 065
KITTEDGE, C. P.

Test program for temporary fire-control equipment (Hedgehog) pilot unit.
Columbia Univ. - Div. of War Research
Feb. 19, 1943 2p.

This describes laboratory tests and sea trials of temporary fire-control equipment. The tests to be conducted are listed.

D16/R170 066
FISH, P. E.

Field operations at Lakehurst N.A.S.
Columbia Univ. - Div. of War Research
Feb. 22, 1943 2p.

The purpose of the field operation was to drop a pattern of radio-sono buoys from a blimp and observe their usefulness in reducing the area in which a submarine was thought to be. It was felt that interference from surface ships and partial failure of the buoys were largely

responsible for the failure of the tests to give conclusive results. Plans have been made to duplicate the tests in the near future under better conditions.

D29/R172 067
BREEZE, G. E.
Sea test of 7-40-M fuze
February 14, 1943.
Columbia Univ. - Div. of War
Research
Feb. 20, 1943 1p.

On this date ten Model 7-40-M fuzes were tested, with attached magnetic targets, at sea off Goshen Point. These fuzes contained the new pointed detonators and two-cell batteries. Oscillograph records were made of the functioning of the principal parts of the mechanisms. The results of the test are given in the memo.

D12E/R173 068
SNOW, W. B.
Memorandum for file (Snow).
Columbia Univ. - Div. of War
Research
Mar. 8, 1943 2p.

In this memorandum personnel assignments and responsibility for cooperation on harbor surveys are agreed on. A summary of data desired from harbor surveys is detailed in a table.

D41/R174 069
HORTON, J. W.
Report of telephone call to Dr. Gaylord P. Harnwell.
Columbia Univ. - Div. of War
Research
Feb. 22, 1943, 2p.

This telephone call was made in connection with an analytical study of the geometry of attacks by forward-thrown projectiles using

the chemical range recorder. There is no informational material on the chemical recorder which is based on considerations of attack geometry at this time. It appears that there is no significant relation between activities of the West Coast Laboratory and studies of attack geometry now being considered at New London. Other work is also being carried out at the West Coast Laboratory but this bears little relation to the work being considered at New London. The question of the status of Subsight was also discussed with Dr. Harnwell.

G13/R175 070
GERJUOY, E.
Measurement of the angular characteristics of the WEA 1 projector.
Columbia Univ. - Div. of War
Research
Feb. 23, 1943 7p.

The angular characteristics of the WEA 1 projector were measured here by personnel of the Harvard Laboratory and of the New London Laboratory on February 18. The projector consists of a streamlined steel case in which a transducer unit is mounted in an oil bath. The case is maintained in a fixed fore-and-aft position on the ship while the transducer unit is rotated in azimuth inside of the case. Polar graphs of the data for each run are included along with a plot of the main lobes of the four angular patterns on one sheet.

G13/R176 071
GERJUOY, E.
Angular characteristics of the WEA-1 used as a hydrophone.
Columbia Univ. - Div. of War
Research
Mar. 2, 1943 v.p.

Measurements were made to determine the angular characteristics of the WEA dome and projector used as a hydrophone and split into two sections for use with SLC. Photostats of recorder tracings of the data taken during the tests are included with the report.

D29/R178 072
BREEZE, G. E.

Notes on conferences relating to Block Island sea tests of Model 7-40-M fuze, January 16, and 17, 1943.

Columbia Univ. - Div. of War Research
Feb. 25, 1943 3p.

A series of conferences was held from January 21 to 25, 1943, at New London, New York, and Union City, NJ, to discuss the sea tests at Block Island of the Model 7-40-M fuze. The test results are given and analyzed.

D20/R179 073
Units and parts list of device #D375-1, Indicator-Amplifier-Control Unit, Mk II B, serial #1. Columbia Univ. - Div. of War Research
Feb. 25, 1943 v.p.

Units and parts are listed for the D-20 Mk II ser. #1 amplifier-indicator-control unit. Drawings are included.

P17/R180 074
FULLERTON, D. P.
Status of development of sea-water cells. Columbia Univ. - Div. of War Research
Feb. 25, 1943 9p.

Sea-cells have been proposed as power sources for contact fuzes and

magnetic bombs. The Burgess Laboratories Type 22 cell was developed for a contact fuze. This cell is satisfactory when used with a 3-ohm preload to actuate a 3 ohm detonator. Both Burgess and Bell Telephone Laboratories have developed a larger cell for the magnetic bomb. In some cases, the voltages of both these cells are too low to operate the magnetic detonators. However, this difficulty may be overcome by connecting two cells in series. In the future, sea-cells that contain their own electrolyte may be developed.

D16/R182 075
BARKSON, J. A.

Conferences at Aircraft Radio Laboratory, Wright Field, Dayton, Ohio.

Columbia Univ. - Div. of War Research
Feb. 26, 1943 5p.

Preliminary instruction manuals, specifications for the Mark IV E transmitter, and other items pertaining to the expendable radio sonobuoy were discussed at these conferences.

D36/R183 076
CERNY, J. A.

Pneumatic projector for the Mark V float light (for use by lighter-than-air craft).

Columbia Univ. - Div. of War Research
May 10, 1943 v.p.

The need to drop float lights vertically from aircraft initiated development work on retro-propulsion by rockets, including the provision of rocket motors and a suitable projector. The present project was undertaken to provide an alternative to a

design developed at the California Institute of Technology and to satisfy the needs of the lighter-than-air craft, with its relatively low but highly variable ground speed. The initial design used spring propulsion. However, such a mechanism was found to be unsuited for speeds in excess of 35 knots. A second design, involving pneumatic propulsion, was built and tested. This design was improved and resulted in a satisfactory projector for expelling the Mark I float light at speeds up to 75 knots. Photos, drawings, and graphs are included with the report.

D41/R186 077
SEELEY, E. S.

Subsight recordings made February 26, 1943.
Columbia Univ. - Div. of War Research
Mar. 2, 1943 3p.

Subsight recordings were made from the USS SC-665 on February 26, 1943, in cooperation with the USS S-20. The submarine submerged to a depth of about 8-ft and followed a straight course at a speed of about 3 knots.

D16/R188 078

Operation and use of the expendable radio sono buoy equipment.
Columbia Univ. - Div. of War Research
Apr. 13, 1943 14p.

The expendable radio sono buoy is a hydrophone which does not require wires connecting it to the sound-operator's equipment. The sound picked up underwater is broadcast from a floating miniature radio transmitter which is connected to the hydrophone. The sound operator, at a distance, can operate a radio-receiving set and

hear all sounds which reach the hydrophone. This preliminary manual describes the ERSB and gives instructions for its use. Photos are included.

D16/R189 079

JASPER, H. N.
Battery-life tests with Mark IV D transmitter.
Columbia Univ. - Div. of War Research
Mar. 3, 1943 8p.

This report covers tests made to compare several types of battery packs for the expendable radio sono buoy. Comparisons between certain brands of batteries, the effect of temperature, and make-up of the pack were obtained. Tests were made using typical transmitters of the Mark IV D type. It was found that battery performance is not uniform with X493 batteries (Eveready). Lighter-weight batteries having a plate battery section half the size of the X493, combined with somewhat greater filament battery capacity, were found to give satisfactory results both at room temperature and under the cold-condition tested. Graphs are included with the report.

D16/F190 080

FISH, P. E.
Langley Field operations tests, use of odograph for marking buoys.
Columbia Univ. - Div. of War Research
Mar. 3, 1943 2p.

A flight was made to test the usefulness of the odograph in marking positions of expendable radio sono buoys. The test coordinated the navigational problems of a buoy pattern with the odograph's operation. A permanent navigational position was used to calibrate the odograph for wind velocity.

D41/R191

081

HORTON, J. W.

Proposed arrangement of
Subsight.
Columbia Univ. - Div. of War
Research
Mar. 3, 1943 v.p.

Subsight is an echo-ranging system that receives information on the true slant range between two vessels and on the rate of change of this range. It gives a significant indication at a predetermined time in advance of the instant when some preselected range is to occur. Computations show that the correct firing range varies between wide limits for variations in either depth or aspect of the target vessel. If Subsight is set up on the basis of a slant range at time of contact computed for a 50-yd depth and for a time advance corresponding to the time of projectile travel to this depth, it will be correct for the majority of attacks without further adjustment. Graphs and drawings are provided.

P17/R194

082

ROCKWELL, G. O.

Special electric detonators for
condenser firing circuits.
Columbia Univ. - Div. of War
Research
Mar. 5, 1943 2p.

The Hercules Powder Company has developed several low-current type detonators to be used with electric fuzes. These include the BS-5, the semi-cap, and the HP cap, the most sensitive of the three. The caps tested at the New London Laboratory gave very satisfactory results. Resistances in one group of detonators varied between 700 and 10,000 ohms.

D12B/R195

083

HERRNFELD, F. P.

Program repeater for Chesapeake
Bay cable installation.
Columbia Univ. - Div. of War
Research
Mar. 19, 1943 7p.

The program repeater and associated equipment requested for the Chesapeake Bay cable installation has been completed. This report describes the equipment and includes a schematic circuit diagram, a list of amplifier specifications, and graphs.

D16/G10/R196

084

MASON, R. I.

Semi-automatic launching
expendable radio sono buoy.
Columbia Univ. - Div. of War
Research
Mar. 5, 1943 2p.

An improved expendable radio sono buoy is proposed. This buoy will feature semi-automatic launching, slow flight with easy impact, and no static line.

G13/R198

085

HANCOCK, J. O. and GRIFFIN, R. H.

Data taken in study of WEA-1
performance aboard USS SC-665,
February 16 to 17, 1943.
Columbia Univ. - Div. of War
Research
Mar. 5, 1943 9p.

The performance of the WEA-1 installation aboard the USS SC-665 was studied, using two projector-dome combinations. The following quantities were measured: noise, echo-intensity, echoes from submarines, and beam patterns of projectors. Graphs are included.

D42/R200
KITTRIDGE, C. P.

086

Gun Train Indicator, Mk 53.
Columbia Univ. - Div. of War
Research
Sept. 10, 1943 v.p.

In training Projector, Mk 10, (Hedgehog), it is necessary to maintain the reference plane of the spigots in a vertical position or at a pre-selected angle with the vertical regardless of the roll of the ship on which it is mounted. At the request of the Bureau of Ordnance, development of a temporary substitute for the equipment normally used, and on which deliveries were to be delayed, was undertaken. This substitute, identified as Gun Train Indicator, Mk 53, was designed in accordance with requirements and production of 75 units has now been completed. Photos and a drawing are included.

D24/R201
CHAPMAN, R. Y.

087

Modification of line supply for sonic-receiver amplifier submarine installation.
Columbia Univ. - Div. of War
Research
Mar. 8, 1943 5p.

It is recommended that several alterations be installed as soon as possible on USS PERMIT, POMPAÑO, and PICKEREL. These measures are necessary so that electrical inductive noise originating from within the ship will not interfere with the operation of the sonic receiver. The alteration involves installing a direct line and a filter, which have been found to completely eliminate all electrical interference.

G10/G15/R202
ROCKWELL, G. O.

088

Proposed method of locating direction of depth-charge attack.
Columbia Univ. - Div. of War
Research
Mar. 10, 1943 1p.

This proposal suggests that methods similar to those used in oil fields could be employed in submarines to enable the crew to locate the direction of a depth-charge attack.

D38/D24/R203

089

Specification for 3-ft straight magnetostrictive hydrophone and baffle.
Columbia Univ. - Div. of War
Research
Mar. 23, 1943 v.p.

This specification and associated drawings cover the engineering requirements for a 3-ft straight magnetostrictive hydrophone and baffle. The hydrophone is bidirectional and, to make it unidirectional, an acoustic baffle is used, consisting of a streamlined hollow bronze casting, the back of which is covered with a special rubber pad. The complete hydrophone and baffle assembly weighs approximately 48 lb.

D20/R204

090

Unit parts lists of device #D375-3 Indicator-Amplifier-Control Unit, Mk II A, serial #3.
Columbia Univ. - Div. of War
Research
Mar. 11, 1943 v.p.

The equipment discussed in this report is for use with W.A.A. echo-ranging equipment. Numerous drawings are included.

D26/R206 091
HORTON, J. W.
Visit to the Sangamo Electric
Company, Springfield, IL.
Columbia Univ. - Div. of War
Research
Mar. 12, 1943 8p.

W. Perine, and J. Horton
visited the Sangamo Electric Company
to discuss the involvement of the
company in projects relating to
anti-submarine work. These
projects include the following:
(1) use of the chemical recorder to
determine range-to-fire in
submarine attacks with
forward-thrown projectiles, (2)
chemical recorders for new QC
stacks, (3) range-recorder
developments, and (4) attack
teachers. A graph is included.

D16/R207 092
FISH, P. E.
Visit to Boston ASW.
Columbia Univ. - Div. of War
Research
Mar. 1, 1943 1p.

P. E. Fish gave a talk on the
expendable radio sono buoy to a
group of officers being trained in
anti-submarine warfare.

G12/R208 093
GERJUOY, E.
Memorandum for file.
Columbia Univ. - Div. of War
Research
Mar. 16, 1943 8p.

The characteristics of the JN
sound gear have been measured on
the C-23-2 hydrophone. Three
different shields were used. In
the measurements, the output of the
hydrophone was fed into the
calibrating preamplifier, through
the sound-frequency analyzer, and
into the Sound Apparatus Company
recorder. The discrimination and
gain of each shield is recorded.
Graphs are included.

D16/R209 094
Outline of instruction course
for operators of the expendable
radio sono buoy equipment.
Columbia Univ. - Div. of War
Research
Mar. 16, 1943 6p.

An introductory course for
operators of the expendable radio
sono buoy equipment is outlined.
Topics to be covered include an
overall description of the ERSB, a
detailed account of the different
parts of the ERSB and their
function, and the testing, use, and
maintenance of the equipment.

D16/R210 095
I. Introductory lecture for
operators of the expendable radio
sono buoy (sample lecture).
Columbia Univ. - Div. of War
Research
Mar. 16, 1943 2p.

This report presents background
information on the expendable radio
sono buoy.

D16/R211 096
II. The expendable radio sono
buoy, its operation and use (sample
lecture).
Columbia Univ. - Div. of War
Research
Mar. 16, 1943 3p.

The expendable radio sono buoy
is a device that uses sound as a
means for detecting submarines.
This report briefly discusses how
it works, when it is used, and how
it is put into use.

D42/R212 097
KITTREDGE, C. P.
Tests of Mark 53 gun-train
indicator at Miami, FL.
Columbia Univ. - Div. of War
Research
May 13, 1943 2p.

The Mark 53 gun-train indicator was mounted on USS BRANNAN, DE-13. Several tests were performed, including two inconclusive roll tests. Officers in the 7th Naval District appear eager to test new anti-submarine devices and would probably welcome closer contact with the New London Laboratory.

G30/R213 098
HERRNFELD, F. P.
Memorandum for file.
Columbia Univ. - Div. of War Research
Mar. 17, 1943 v.p.

The NL 105 amplifier has been completed. The electrical specifications and an electrical description of the amplifier are given in this report. Graphs and a photo are included.

D12/R215 099
PROUDFOOT, D. A.
Outline for the compilation of data and preparation of report on New York harbor survey.
Columbia Univ. - Div. of War Research
May 16, 1943 6p.

An outline for the report on the New York harbor survey is proposed. It is suggested that the report should contain background data-transmission measurements, oceanographic measurements and observations, coordination of transmission and oceanographic data, and conclusions.

G12/D12E/R216 100
HERRNFELD, F. P.
Memorandum for file.
Columbia Univ. - Div. of War Research
Mar. 19, 1943 6p.

A sample amplifier to be used with a Brush Development Co. C43 hydrophone has been built. The design requirements are a high signal-to-noise ratio and good stability with change in temperature of the hydrophone-amplifier combinations. Extra precaution has been taken to make the amplifier as shockproof as possible. Acoustic calibrations have been made using the hydrophone and the amplifier. A drawing and graphs are included.

D24/D-38/R217 101
SNOW, W. B.
Conference on NL-105 amplifier design.
Columbia Univ. - Div. of War Research
Mar. 19, 1943 6p.

A conference was called to decide on the design of the NL-105 amplifier. This amplifier will be used in almost all sonic listening applications, including topside, through-the-hull, and overside. The report lists the decisions that were made and summarizes the discussions that accompanied them.

P16/R218 102
JASPER, H. N.
Report on tests of battery harness, per drawing 11769B, for D16 expendable radio sono buoy.
Columbia Univ. - Div. of War Research
Mar. 30, 1943 3p.

Two samples of the battery harness for the battery pack of the expendable radio sono buoy have been subjected to impact tests to determine their performance in service. Examination of the packs after the drop test indicated that, in spite of the severity of the test, there was no failure of any part of the harness to provide

satisfactory connection. It appears that a battery pack properly assembled with this harness will withstand a normal service shock with a considerable margin of safety.

D38/R219 103
TEAL, E. E.

Preliminary installation instructions for Mark II through-the-hull sonic listening equipment.
Columbia Univ. - Div. of War Research
Mar. 30, 1943 7p.

Through-the hull sonic listening equipment is designed for use on small patrol craft having top speeds of about 12 knots. These preliminary instructions are for use in the installation of the six units of the final design. Photos and drawings are included.

D21/R220 104
CERNY, J.A.

Long-burning float lights.
Columbia Univ. - Div. of War Research
Mar. 19, 1943 2p.

The 60-min float-light design is simpler than that of the 45-min tubular light, and it was decided to test the 60-min design as soon as possible. A basic design for a 4-hr smoke light signal for use with the submarine marker buoy has been tested. The results were satisfactory and further trials will be made.

G13/R221 105

MARKHAM, J. J. and TEAL, E. E.
Underwater reproduction of submarine noise with Bostwick projector
Columbia Univ. - Div. of War Research
Mar. 23, 1943 2p.

To further exploit the use of recorded characteristic ship noises to replace the necessity for the presence of the craft itself, tests have been continued with the Bostwick Type 1K underwater projector. In the current tests, the projector was mounted through the well of the AMADA to transmit recorded submarine signals. These were picked up on through-the-hull listening equipment on the CGR 1985. Tests were conducted on three nonconsecutive days. Quiet conditions seemed to give a slight increase in range, with a maximum range of about 1 1/3 miles and a maximum range of useful signal level of approximately 1 1/4 miles.

D41/D26/R222 106
HORTON, J. W.

Comparative performance of the chemical recorder and Subsight.
Columbia Univ. - Div. of War Research
Mar. 22, 1943 7p.

After careful consideration, there appears to be no logical justification for continuing with the development of Subsight. Except for the fact that it may prove to be more automatic in operation, there is no evidence that its performance can be superior to that of the chemical recorders now in use. There is, on the other hand, considerable evidence that the chemical recorder can and does supply more information than may be expected of Subsight, and that its utility may be further improved.

D29/R224 107
BREEZE, G. E.
Statistical test of 7-40-M fuze
March 11 and 12, and March 19 and
20.
Columbia Univ. - Div. of War
Research
Mar. 30, 1943 2p.

All fuzes used in this test
were equipped with new detonators,
and boosters containing 2/3 oz of
tetryl. It appears that 27, out of
30 units fired, gave a functional
percentage of 90 with an extreme
arming depth of 39 ft, as indicated
by the oscillograph, and 44 ft for
the 5 that were dropped on a target.

G10/R226 109
CERNY, J. A.
Ground speed indicator.
Columbia Univ. - Div. of War
Research
Mar. 24, 1943 1p.

This memorandum discusses a
proposed ground-speed indicator for
aircraft.

D27/R227 110
CERNY, J. A.
Towed projectile.
Columbia Univ. - Div. of War
Research
Mar. 24, 1943 2p.

The details of providing an
experimental towing unit were
discussed.

P21/R228 111
CERNY, J. A.
Float lights for surface craft.
Columbia Univ. - Div. of War
Research
Mar. 22, 1943 2p.

A number of surface craft are
using the Mark V float light for
marking the location of

depth-charge attacks. If this is
to become standard equipment on
surface vessels, it should be much
more convenient and practical to
use the hand-grenade light rather
than the standard impact light. A
photo shows the two lights and a
close-up shows the means of
ignition.

G2/R229 112
FINLAYSON, F. S.
Memorandum of wind-tunnel tests
of a hemispherical parachute.
Worcester Polytech. Inst. -
Aeronautics Lab.
N.D. 3p.

Several wind tunnel tests were
performed on a 5-in. diameter metal
parachute model to determine the
drag coefficient with various
alterations of the surface.
Observations were also made of the
effective stability by allowing the
model to pivot about a support at
various distances ahead of the
maximum diameter. These tests
showed the drag coefficient of a
hemispherical parachute to be
1.25. A parachute having a cross
section similar to a Pelton bucket
had a drag coefficient of 1.27. A
center vent, having a diameter 20
percent of the parachute diameter,
decreased the drag coefficient to
1.19, but improved the parachute
stability to some extent.

G2/R230 113
HOOPER, L. J.
Memorandum of drag measurements
on multiple discs and cones mounted
in series on a rod attached to a
cylinder.
Worcester Polytech. Inst. -
Aeronautics Lab.
Mar. 10, 1943 7p.

Tests were made to determine
the coefficient of drag of a series
of discs and cones mounted on a rod
extending along the axis of a
cylinder. The discs and cones were

the same diameter as the cylinder. The length of the trailing rod was kept at nine cylinder diameters. It was found that surfaces in the shape of a truncated cone, with the sloping surface forward, were not as effective as the discs. It is believed that the results of these tests should be used qualitatively rather than quantitatively. However, the comparisons between the type of discs (their number and spacing) should be reliable. A table and graphs are included.

G2/R231 114
 HOOPER, L. J.
 Stability tests of afterbody.
 Worcester Polytech. Inst. -
 Aeronautics Lab.
 N.D. 7p.

A series of tests was made to determine the effect of tail position and length of tapered afterbody on the stability of a cylindrical model operating in an air stream. The tests indicated that the stability of a cylindrical model was directly proportional to the distance separating the cylinder and leading edge of the tail. The effect of a tapered afterbody between the end of the cylinder and the tail was negligible.

D24/R232 115
 CHAPMAN, R. Y.
 Installation of topside sonic listening equipment on P-class submarines.
 Columbia Univ. - Div. of War Research
 Apr. 12, 1943 v.p.

This report discusses the installation of topside sonic-listening equipment on the USS POMPAÑO, PICKEREL, and PERMIT. Drawings and photos are included.

D24/R233 116
 Supplement to introduction of manual D24/R123, operation, use, and maintenance of Topside Sonic-Listening Equipment for Submarines, Mk II Mod P-24. .
 Columbia Univ. - Div. of War Research
 Mar. 24, 1943 4p.

This supplement includes three photos.

D16/R234 117
 FISH, P. E.
 Expendable radio sono buoy air ASDEVLAN, Quonset, May 16, 1943.
 Columbia Univ. - Div. of War Research
 May 16, 1943 3p.

The flight was intended to detect the presence of a submarine and determine its location when the area enclosing the submarine was known. Two planes, expendable radio sono buoys (Mark IV E), dye slicks, and Mark V float lights were used during this exercise. The pattern for dropping the buoys was modified after three defective buoys were discovered. Sounds from a submarine were not identified at any time throughout the 4-hr operation. However, there were three other sources of underwater sound that were of interest.

D29/R235 118
 BREEZE, G. E.
 7-40-M projectile high-drop tests.
 Columbia Univ. - Div. of War Research
 Mar. 26, 1943 3p.

Five 7-40-M projectiles were dropped from the Jamestown Bridge. The results of the test seem to indicate that the fuze, in its present construction, will not arm before a 20-ft depth is reached and will be armed at a depth of 70 ft.

G12/R236 119
GERJUOY, E.
Temperature variation of the 3A
and C-23 crystal hydrophones.
Columbia Univ. - Div. of War
Research
Mar. 29, 1943 3p.

Experiments were performed to
determine the effects of
temperature variation on the
acoustic responses of the 3A #51
and C-23 #11 hydrophones which had
been used at Key West for
measurements of ship and water
noise. The nature of the
information desired and the
facilities available did not permit
much more than relatively crude
estimates of temperature variation.

P16/R237 120
Preliminary manual installation
and maintenance of the expendable
radio sono buoy equipment.
Columbia Univ. - Div. of War
Research
Apr. 13, 1943 v.p.

This manual discusses the test
and repair of transmitting
equipment (AN/CRT-1) and the
installation, test, and repair of
receiving equipment (AN/ARR-3).
Photos and drawings are included.

G2/R238 121
GONGWER, C. A.
Depth of towed fish and the
general curve of a towing cable in
water or air.
Columbia Univ. - Div. of War
Research
N.D. 7p.

Experimentally determined
curves of towing cables have been
plotted against dimensionless
depths and trail distances. From
this, a single curve has been
derived that has wide
applicability. Graphs are included.

D3/R239 122
Phonograph records of
underwater sounds, series ASRB.
Columbia Univ. - Div. of War
Research

The series ASRB phonograph
records have been prepared for use
in the training of operators of the
anchored sono radio buoy
equipment. All of the examples of
sounds from submarines presented in
this series of 17 records are from
U.S. ships. The report includes a
brief description of the material
contained on each record.

P31/R140 123
FULLERTON, P. P.
Status of underwater-flare
development at Wesleyan University
Columbia Univ. - Div. of War
Research
Mar. 31, 1943 1p.

Work on the underwater-flare
project has proceeded as planned,
but the expected progress has not
been realized.

P35/R241 124
HERRNFELD, F. P.
Test on Audio Development
Company A 3832 output transformer.
Columbia Univ. - Div. of War
Research
Mar. 29, 1943 1p.

The frequency characteristic of
this transformer is within +1.5 dB
from 90 to 25,000 cycles. Further
information on the test is given in
the report and the accompanying
graph.

G1/R242 125
SNOW, W. B.
Report of conference.
Columbia Univ. - Div. of War
Research
Mar. 29, 1943 20p.

This memorandum reports the discussions at a conference on listening techniques held at New London on March 10, 1943. In general, the following topics were discussed: (1) the use of small surface craft in anti-submarine activities, (2) a description of equipment and performance (the equipment included the QBG apparatus, the JP listening gear, and the CK tube), (3) general requirements of listening, (4) listening from blimps, (5) direct listening on large surface ships, (6) listening requirements for submarines, and (7) comparative test program for equipment manufactured by various laboratories.

P16/R243 126
BERANEK, J. A.

Strike-frequency pattern tests of expendable radio sono buoy. Columbia Univ. - Div. of War Research
Mar. 31, 1943 2p.

Three expendable radio sono buoys were dropped in a triangular pattern. A blimp pilot followed this pattern as closely as possible. The submarine was heard clearly, but listening operations were disturbed by a freighter that was passing nearby.

D23/R244 127
CERNY, J. A.

Fuze water-seal plug (SNIVVY). Columbia Univ. - Div. of War Research
Mar. 30, 1943 1p.

The 6-40-C and 7-40-M fuzes require a water seal ('snivvy plug') because of the presence of the sea-battery. If the water seal were redesigned so that it would incorporate a safety-release pin, similar to that of the HIR or other fuzes in use at present, it would simplify the design of bomb racks.

D23/R245 128
MARTIN, G. W.
Squib-latch tests, January 21, 1943.
Columbia Univ. - Div. of War Research
Mar. 30, 1943 9p.

The first model of the squib latch underwent its second set of tests on January 21. After it failed to operate on the tenth and eleventh drops, the latch was disassembled. It is believed that the squib latch failed to operate properly on these trials because of wear on the ball seat. It is proposed that the monel ball seat be replaced with some steel of greater hardness.

P43/R247 129
HERRNFELD, F. P.

SLC input test box. Columbia Univ. - Div. of War Research
May 19, 1943 2p.

A test set for SLC was designed and built by the Electronics Design group. The specifications for the test set are given.

D13/R249 130
BUMBAUGH, H. L.

Interval tests. Columbia Univ. - Div. of War Research
Apr. 8, 1943 4p.

At the request of the Bureau of Ships, an investigation was undertaken to determine if an optimum length of listening interval exists when switching from one hydrophone to another in a series of cable-connected hydrophones or from one buoy to another in the case of radio sonic buoys. The tests indicated that, for short periods of listening, the shortest interval (2 s)

gave somewhat greater detectability than the longer intervals. However, 2-s intervals lead to rapid fatigue, and it seems that 3- or 4-s intervals would give optimum results for observing periods of reasonable length.

D16/R250 131
BERANEK, J. A.

The expendable radio sono buoy in Trinidad, BWI, operations. Columbia Univ. - Div. of War Research
Apr. 24, 1943 13p.

This memorandum is a report of the operations at Trinidad, BWI, in the period from December 16, 1942, to February 24, 1943. The writer visited the station to check the operation, and instruct personnel in the use, of the expendable radio sono buoy, and to check related techniques involving dye slicks and the Mark V float light. The writer also assisted in preparing a plan for tactical operations.

D42/R251 132
KITTREDGE, C. P.
Tests of Gun-Train Indicator, Mk 53 Mod 0. Columbia Univ. - Div. of War Research
May 13, 1943 3p.

The gun-train indicator was mounted on USS BRANNAN, DE-13. Roll tests showed that the bubble of the Mark 53 indicator was very sensitive and, although it probably responded to the force applied to it by the ship, a higher degree of damping would be desirable. An attempt will be made to find a suitable liquid that will provide the necessary damping.

D24/R252 133
SNOW, W. B.
Topside listening gear. Columbia Univ. - Div. of War Research
Apr. 2, 1943 3p.

Loudspeakers will be added to topside listening gear that is being built for the Navy. The sturdiest available loudspeakers, RCA and Submarine Signal Company models, were tested. A graph showing the test results is included.

D35/R254 134
PERINE, W.
Conversation with CDR Edwards (BuOrd). Columbia Univ. - Div. of War Research
Apr. 1, 1943 2p.

W. Perine's telephone conversation with CDR Edwards concerning GE attack plotters is summarized.

D23/R255 135
ROCKWELL, G. O.
Fuze water-seal snivvy plug. Columbia Univ. - Div. of War Research
Apr. 5, 1943 1p.

The feasibility of eliminating the present type of snivvy used in the 6-40-C type fuze and the 7-40-M fuze is discussed. J. A. Cerny has suggested alternate designs. One involves a change that will be easy to make on the 6-40-C but will be more complicated on the 7-40-M.

D29/R256 136
BREEZE, G. E.
Statistical test of 7-40-M fuze, February 27, 1943. Columbia Univ. - Div. of War Research
Apr. 8, 1943 1p.

Five Model 7-40-M fuzes, minus boosters, were dropped from Jamestown bridge. Two readable records showed proper functioning of all components. However, when five Model 7-40-M fuzes, with boosters, were dropped from the bridge, no explosions were heard and it was believed that the detonators were not setting-off the boosters. All fuzes used in this test contained two-cell batteries and pointed detonators. They were dropped in dummy bombs.

D10/R257 137
BREEZE, G. E.

Rerun statistical test of 6-40-C fuze, March 29, 1943.
Columbia Univ. - Div. of War Research
Apr. 8, 1943 1p.

Twenty-eight model 6-40-C fuzes were tested at Block Island in a skeleton bomb dropped against a submerged steel target. The test was regarded as a 100 percent test of 25 units. All fuzes were equipped with two-cell batteries, pointed detonators, and the explosive loads specified by the fuze group on March 8, 1943.

D24/R258 138
Specification for DC power-supply filter for NL-105 amplifier.
Columbia Univ. - Div. of War Research
Apr. 6, 1943 v.p.

This specification lists the engineering requirements for a noise-suppression filter which is to be used in the dc line supplying power to a Model NL-105 amplifier. It contains a general description of the filter and lists electrical requirements, mechanical requirements, tests, and spare parts. A photo and a drawing are included.

P20/R259 139
Installation and operation of NDRC Model I AVC unit for NDRC Mark II D-20 indicator-amplifier-control unit for Types QC and WAA echo-ranging equipment.
Columbia Univ. - Div. of War Research
Mar. 29, 1943 v.p.

This manual discusses a set of automatic volume control equipment to be used with the Mark II echo-ranging gear. The apparatus, its circuits, and SLC theory are discussed. Operating instructions are provided for the relative gain adjustment, the automatic volume control, and manual operation of the common-gain control. Installation directions are given for the SLC amplifier, the CRO chassis, the 755 amplifier, and the console. Graphs, photos, blueprints, and a parts list are provided. The indexing system used in this manual is the same as that of instruction manual D20/R168. The reader is referred to D20/R168 for further instructions regarding this equipment.

D44/R260 140
BUSH, W. M.
Sickles coils Nos. 12724, 12725, and 12726.
Columbia Univ. - Div. of War Research
Apr. 13, 1943 3p.

This memorandum reports on measurements made on Sickles coils 12724, 12725, and 12726. The measured parameters are given in the report. All values are for 50 kc, unless otherwise stated, as measured on the Q-meter. The values of L and Q given are those pertaining to the coil, after the removal of stray capacity effects. All values apply with the trimmers disconnected.

D16/R261 141
GERJUOY, E
Calibration of C-43 (AX-11) #4
hydrophone.
Columbia Univ. - Div. of War
Research
Apr. 6, 1943 2p.

Attached to this memo is the
response curve of the C-43 (AX-11)
#4 hydrophone.

G1/G20/R262 142
SNOW, W. B.
Conference on underwater
background noise.
Columbia Univ. - Div. of War
Research
Apr. 12, 1943 4p.

This conference was held on
April 1, 1943, and was attended by
about 60 people representing Army,
Navy, and NDRC groups interested in
underwater background noise. The
agenda included work done to date,
future work needed, and the
allocation of future work. Maximum
background noise, variations in
levels, minimum background noise,
and noise of biological origin were
among the major topics of
discussion.

D20/R264 143
MCGEENEY, J. J.
Doppler doubler.
Columbia Univ. - Div. of War
Research
Apr. 8, 1943 4p.

LCDR J. Meyers, USN, West Coast
Sound School, has developed a
'Doppler-doubler,'
'Doppler-enhancer,' or 'squacker.'
He hopes that this device will be
installed in the many echo-ranging
installations to which SLC will
never be applied. The doubler
consists of untuned input and
output transformers, a 'mixing'
stage, and an oscillator capable of

producing frequencies between 36
and 50 kc. Drawings are included.

D20/R265 144
MCGEENEY, J. J.
Comments on the chemical
recorder.
Columbia Univ. - Div. of War
Research
Apr. 8, 1943 2p.

The chemical recorder is
considered one of the more
important conning aids in use today
and also one of the least
dependable pieces of equipment.
The following problems occur most
frequently: (1) burned keying and
carriage contacts, (2) leakage
between contacts, (3) tearing of
recorder paper, and (4) burned-out
magnetic-clutch coils.

D16/R266 145
FISH, P. E.
Single-channel operational
tests, Quonset, March 18, 1943.
Columbia Univ. - Div. of War
Research
Apr. 9, 1943 2p.

Three buoys operating on the
same frequency were dropped south
of Fishers Island in approximately
an equilateral triangle, 2 miles on
a side. The characteristics of
this pattern were noted.

D16/R267 146
FISH, P. E.
Single-channel operational
tests, Quonset, March 23, 1943.
Columbia Univ. - Div. of War
Research
Apr. 9, 1943 2p.

In these tests, the operation
of the Mark IVC and the new Mark
IVD buoys was studied. A more
satisfactory test was thought
desirable and will be carried out
in the near future for LCDR Wait.

D16/R268 147
FISH, P. E.
Single-channel operational tests at Langley Field, April 1, 1943.
Columbia Univ. - Div. of War Research
Apr. 9, 1943 2p.

Two expendable radio sono buoys were dropped 3 miles apart off Cape Henry. The test consisted of monitoring the performance of the buoys.

D16/R269 148
FISH, P. E.
Visit to Squadron VP-63, Elizabeth City, NC, March 30, 1943.
Columbia Univ. - Div. of War Research
Apr. 9, 1943 1p.

A. G. Wambach and the author were flown to the Norfolk Naval Air Station to meet LCDR Kock and pick up a shipment of buoy equipment for Squadron VP-63. The uses of the buoys were discussed.

D16/R270 149
FISH, P. E.
Expendable radio sono buoy pattern test single-channel operation, April 2, 1943.
Columbia Univ. - Div. of War Research
Apr. 9, 1943 2p.

This flight was undertaken to study the operation of a pattern drop consisting of three expendable radio sono buoys functioning on the same frequency. Plans for future tests anticipate trials at higher cruising speeds.

D38/R271 150
Specification for through-the-hull training gear.
Columbia Univ. - Div. of War Research
Apr. 13, 1943 v.p.

This specification and the associated drawings cover the engineering requirements for a manually trained mechanism to be mounted through the hull of a ship.

D16/R272 151
FISH, P. E.
Use of odograph for marking buoys.
Columbia Univ. - Div. of War Research
Apr. 9, 1943 2p.

This memorandum reports on a flight that demonstrated that the odograph could be of considerable assistance in placing expendable radio sono buoys. Subsequent flying over the pattern of buoys can be more easily organized and the relative locations of pattern elements can be coordinated with carrier frequencies.

D16/R273 152
FISH, P. E.
Field operations at Alameda, CA, with Squadron VP-63, March 11, 1943.
Columbia Univ. - Div. of War Research
Apr. 9, 1943 2p.

The author reports on the testing of expendable radio sono buoys by Squadron VP-63.

P18/R274 153
HOOPER, L. J.
Preliminary memorandum method of measuring force with calibrated 5/32-in. copper balls.
Columbia Univ. - Div. of War Research
Apr. 9, 1943 9p.

Two series of tests have been made to calibrate 5/32-in. diameter copper balls. Two consistent force calibration curves were prepared for the copper balls, depending on whether the force was suddenly or gradually applied. With a suddenly applied load, kinetic energy stored in the loading plunger adds to the deformation of the copper ball. More tests will be required to define the transition region from a gradual to a sudden application of force. A graph and a drawing are included.

D34/R275 154
GONGWER, C. A.

Methods of rotating the expendable radio sono buoy. Columbia Univ. - Div. of War Research
Apr. 23, 1943 9p.

Two possible methods of rotating the expendable radio sono buoy have been investigated. The first uses a carbon-dioxide reaction jet. Unfortunately, the CO₂ motor is unsuitable for any but the smallest hydrophones. Larger hydrophones would require a prohibitively large CO₂ bottle. The second method involves the use of a rubber-band motor. The rubber motor is reliable after it is launched and adds only to the draft of the assembly. However, launching and storage present problems that still require investigation. A drawing and graphs are included.

D24/R276 155
Specification for baffle adapter model NL 111. Columbia Univ. - Div. of War Research
Apr. 13, 1943 v.p.

This specification and associated drawings cover the manufacturing information for an

adapter for securing a baffle to a 10-in. diameter flange. This adapter consists of a flanged bronze casting that contains a watertight seal for bringing a 1/2-in. diameter rubber-covered cable through the casting. Three supporting arms are provided for holding a baffle. The flange face of the casting is manufactured to form a watertight seal with a similar flange when bolted to it with packing.

D20/R277 156
STEPHENSON R. G.

Range scale for CRO on D-20 stack. Columbia Univ. - Div. of War Research
Mar. 31, 1943 3p.

The practicability of a range scale that does not depend for accuracy on individual calibration for each console has been studied. It is feasible to furnish each stack with a range scale that is accurate in calibration to better than the accuracy to which the suggested scale could be read. A drawing of the proposed scale is attached.

P44/R278 157
FRITZ, W. H.

Adaptation of anchored vessel screening equipment. Columbia Univ. - Div. of War Research
Apr. 12, 1943 1p.

It is proposed that the equipment developed in connection with anchored vessel screening be tested at ranges of 1000 to 2000 yd in deep water with a submarine target.

D29/R279 158
GOURLEY, G. M.
Visit to Naval Mine Depot,
Yorktown, VA.
Columbia Univ. - Div. of War
Research
Apr. 10, 1943 2p.

The purpose of this visit was to investigate and correct difficulties encountered at the Naval Mine Depot with loaded 7-40-M projectiles. It was found that insertion of the fuze in the projectile was impossible due to deformation of the threaded section of the loaded case. These conditions were corrected and recommendations were made to eliminate their recurrence. Other useful information was obtained.

D16/R280 159
Specification for cylindrical
magnetostrictive hydrophone Model
D-16 Mark IV E.
Columbia Univ. - Div. of War
Research
N.D. v.p.

This specification covers the requirements for a cylindrical hydrophone of the magnetostrictive type equipped with an extension tube on which the attached cable can be coiled. Approximately 500 hydrophones were manufactured in accordance with specification D16/R141, which this specification supersedes. A drawing is included.

D16/R282 160
Langley Field.
Columbia Univ. - Div. of War
Research
Mar. 30, 1943 2p.

This memorandum reports on a flight that investigated the advantages of using several D-16 expendable radio sono buoys of the same frequency in a pattern.

D38/R283 161
Specification for baffle
adapter, Model NL 112.
Columbia Univ. - Div. of War Research
Apr. 15, 1943 v.p.

This specification and associated drawings cover the manufacturing information for an adapter for securing a baffle to a 3-in. diameter shaft. This adapter consists of a bronze casting containing a watertight seal for bringing a 1/2-in. diameter rubber-covered cable through the casting.

D21/R285 162
HOOPER, L. J.
Velocity traverses and
stability tests of Mark V flare.
Aeronautics Laboratory, Worcester
Polytechnic Institute, March, 1943.
Columbia Univ. - Div. of War
Research
Apr. 22, 1943 9p.

Tests were made in a wind tunnel to measure the stability of the Mark V flare and to determine the velocity distribution over the afterbody. Tests with the tail structure removed showed that a flare with a flat nose is much more stable than one with a hemispherical nose. The flat-nosed flare is only slightly superior to the round-nosed flare when the tail structure is in place. The flat nose reduces the velocity of the fluid flowing over the tail structure. Reducing the fin area reduces the stability uniformly at all angles of yaw. Reducing the area of the box section of the tail structure had little effect at small angles of yaw, but seriously reduced the stability at angles of yaw in excess of 60 deg. Graphs, drawings and charts are included.

D10/D29/R287 163
MARTIN, G. W.

Visit of Dr. W. B. Ellwood of
U.S. Navy, Bureau of Ordnance.
Columbia Univ. - Div. of War
Research
Apr. 17, 1943 2p.

On April 14, Dr. Ellwood, of
the U.S. Navy, Bureau of Ordnance,
visited the Laboratory. The 7-40-M
fuze and the 6-40-C fuze were
discussed.

G1/R288 164
SNOW, W. B.

Outline of a program of tests
concerning listening techniques,
G-1.
Columbia Univ. - Div. of War
Research
Apr. 12, 1943 8p.

This memorandum presents a
preliminary outline of research
questions in the area of listening
techniques. When listening in the
supersonic range the questions
include (1) what frequency band
is optimum?, (2) where should the
heterodyned band be placed in the
audio spectrum?, (3) what
supersonic frequency range gives
the greatest detection range?, and
(4) what is the optimum
directivity? Questions concerned
with listening in the sonic range
and with sonic listening versus
supersonic listening were also
raised.

D20/R289 165
STEPHENSON, R. G.

Range scale for proposed
console-type stack.
Columbia Univ. - Div. of War
Research
Apr. 22, 1943 3p.

This memorandum proposes
several modifications to the range
scale described in "Range scale for

D-29 Stack, D20/R277, March 31,
1943." The modifications include
providing two sweep rates on the
CRO screen and rearranging the
calibration marks to light one
scale at a time. The modifications
are necessary because a 5-in.
cathode-ray tube with SLC
indication only will be used in the
new console-type stacks. A drawing
is included.

D17/R290 166
TATUM, A. K.

Notes on JK listening tests,
April 15, 1943.
Columbia Univ. - Div. of War
Research
Apr. 15, 1943 2p.

A program of sonic listening
with the JK transducer is in
progress. A short series of
directivity and range tests was
made on April 15, 1943, while
listening from USS SEMMES. The
useful range of the gear under
these conditions was about
1500 yd. Further tests are planned
for April 16.

D22/R291 167
Specification for baffle

adapter Model NL 114.
Columbia Univ. - Div. of War
Research
Apr. 20, 1943 v.p.

This specification and
associated drawings cover the
manufacturing information for an
adapter for securing a baffle (per
specification D38/D24/R203) to a 1
1/2 in. pipe. The adapter consists
of a bronze casting having three
supporting arms provided for
holding a baffle.

D34/R292 168
MANINGER, R. C.
Program for study, Project D-34.
Columbia Univ. - Div. of War
Research
Apr. 22, 1943 2p.

A tentative program of study was outlined to determine the best type of hydrophone to use with the directional-radio-sono buoy. It was decided that the hydrophones to be tested would be the 3-, 2-, and 1-, and the 6-in. magnetostrictive line hydrophones and the bone-conduction-type hydrophone used with both a carotid pattern and a null pattern. Factors to be considered in testing a hydrophone were discussed.

D16/R293 169
MASON, R. I.
Visit to Kollsman Aircraft
Instrument Company.
Columbia Univ. - Div. of War
Research
Apr. 22, 1943 4p.

This report covers a visit made to Kollsman Instrument Company, where general talks about the magnetic-compass condenser were conducted. The purpose for this instrument could not be discussed but the features of the compass condenser as an independent unit were outlined. The instrument must stand aircraft transportation, water impact of 40 mph, and wave motion for 2 hr. Kollsman estimated a \$15-\$20 unit price for the instrument and provided Mr. Mason with the names of supply sources. The design is thought to be practical, so planning will commence immediately.

D12B/R294 170
WAGNER, R. A.
Matching C-37 hydrophones to
cable.
Columbia Univ. - Div. of War
Research
Apr. 20, 1943 1p.

This memorandum discusses the possibilities of better matching for the C-37 hydrophones now on hand to the cables with which they are to operate. After some investigation, it was decided that the WE 146U repeating coil offered the best possibilities of the available standard models. The net gain might be somewhat improved by using the 146U coil; however, this increases the chance of a ground imbalance on the line. It was agreed that this disadvantage more than outweighed the slight gain of a fraction of a dB, so a better match seems doubtful.

G2/R295 171
HOOPER, L. J.
Drag tests of streamline shapes
and cylindrical hydrophones.
Worcester Polytech. Inst. - Alden
Hydraulic Lab.
Apr. 1943 25p.

Two series of tests were made to determine the drag coefficients of streamlined baffles for cylindrical hydrophones. These tests were made on the circular current-meter-rating station of the Alden Hydraulic Lab. The first series showed that the shape of the forward part of the cross section had relatively little effect on the drag. In the second series of tests, a semi-streamlined baffle was added to a cylinder representing a hydrophone. The effect of the space afterbody had an even greater effect on the coefficient of drag. It was found desirable, from a hydraulic point of view, to make this space as small as possible to secure a

relatively low coefficient of drag, as well as to avoid a sharp corner at the transition between the cylinder and the afterbody. Diagrams and tables are included.

D44/R296 172

FRITZ, W. H.

Notes on anchored-vessel screening.

Columbia Univ. - Div. of War Research

Apr. 23, 1943 20p.

British reports have advised that the fundamental problem involved in anchored-vessel screening is to indicate the approach toward vessels at anchor of a small subsurface weapon from any relative bearing at water speeds up to 4 knots. A 200-yd range would be adequate. The general method used in developing a device for warning anchored vessels is to apply Cobar principles to the protecting device. Discussed at length in these notes are transducer assembly, amplifier and preamplifier units, intermediate frequency chassis, audio and visual indicators, preselectors, and signal to reverberation ratio. The writer indicates readiness to proceed with plans that will aid in the process of anchored-vessel screening.

D16/R297 173

NEFF, W. D.

Equipment for training of expendable radio sono buoy operators.

Columbia Univ. - Div. of War Research

Apr. 23, 1943 3p.

This memorandum discusses the equipment needed for instructors of expendable radio sono buoy operators. Among the necessary

materials are (1) instruction manuals on the ERSB, (2) a "picture-book" type instruction manual, (3) Series D-16 phonograph records with a manual describing their use, (4) three 15-min slide films with sound, (5) an ERSB (all dummy parts included), (6) float lights, (7) sea-markers, (8) spare battery packs and parts for transmitter and receiver, (9) phonograph record player (needles included), and (10) a projector.

G12/R298 174

GERJUOY, E.

Characteristics of GB5-2 and C-26 transducers.

Columbia Univ. - Div. of War Research

Apr. 22, 1943 3p.

The performance characteristics of the GB5-2 and C-26 transducers have been analyzed with recorder curves of the various beam patterns, including those of a hydrophone for 360 deg and +60 deg and for a projector for +360 deg. In interpreting the curves, it was noted that, although every effort was made to keep the levels comparable for all curves, the variation in projector and detector sensitivity prevents comparison at different frequencies, and even at the same frequency, different days should not be compared directly. All runs on the GB5-2 were made at the same level, which was about 20 dB higher than the level used for the C-26, corresponding to the difference in sensitivities of the two units.

D42/R299 175

Manufacturing specifications for Gun Train Indicator, Mk 53 Mod 1.

Columbia Univ. - Div. of War Research

Jun. 25, 1943 9p.

This specification, together with the associated drawings, covers the manufacturing requirements for Gun-Train Indicator, Mk 53 Mod 1. The instrument consists of a series of gears, shafts, links, and dials, assembled and mounted on a bed plate, and enclosed in a bronze casing in such a manner that a pointer can follow a bubble in a glass level tube. Provision is also made to advance or retard the action of the pointer with respect to an input shaft. The specification also includes notations on requirements, inspection, packing, suppliers of purchased parts, and parts list.

G1/R300 176
 LOYE, D. P.; MANINGER, R. C.; HOFF, H. B.; and TATUM, A. K.

Key West submarine and water-noise measurements.
 Columbia Univ. - Div. of War Research
 Apr. 20, 1943 27p.

Measurements were made in Key West of ambient water noise and noise of the submarine USS R-14. The noise level in the three channels measured (300-600 cps band, 1600-3200 cps band, and a 500 cps band centered at 20 kc) varied with different sea and wind conditions. Indications of these measurements can be found in the accompanying tables and graphs.

D24/D38/R301 177
 TEAL, E. E.

Report of conference concerning Permoflex headphones.
 Columbia Univ. - Div. of War Research
 Apr. 23, 1943 2p.

The conference held on April 16, 1943, concerned the tests made on the Permoflex moving-coil

headphones and steps that could be taken to increase their frequency range for the needs of the underwater-sound work rather than to be limited to the 4000 cps cut-off used for Army and Navy communications work. The discussion brought out a need to reduce the cavity behind the diaphragm, as well as to change air vents around the diaphragm, to raise the resonance point. Permoflex requested that specific impedances be indicated.

D44/R302 178
 HERRNFELD, F. P.

Bandpass preamplifier for AVS
 Columbia Univ. - Div. of War Research
 May 17, 1943 4p.

The 122588E amplifier, which has been designed as a selective preamplifier for the Cobar system, is a two-stage resistance-coupled amplifier. A bandpass filter designed to work in a 5000-ohm circuit is fed directly from the plate of the output tube. A drawing and graph are included to depict the structure in detail.

D24/R303 179
 SNOW, W. B.

Visit to Key West, February 18 to 28, 1943.
 Columbia Univ. - Div. of War Research
 Apr. 27, 1943 4p.

As a result of a trip to Key West, FL, information on the experimental topside gear installations on the R-class submarines was gathered. The writer also visited the Subchaser Training Center in Miami and interviewed two echo-ranging instructors who expressed interest in the possibilities of a wide-beam device, or some other system which

would give more continuous search.
They were assured that work is
being done in this area.

D17/R304 180
TATUM, A. K.

Notes on JK listening tests,
April 16, 1943.
Columbia Univ. - Div. of War
Research
Apr. 26, 1943 2p.

The listening tests on the USS
SEMMES were continued with
recordings being made of noise from
several ships, including the
submarine USS S-20 and ambient
noise from the USS SEMMES while
operating at speeds from 5 to 20
knots. Plans are being made to
install listening equipment, using
the JK head on the USS-S-20, for
submerged listening tests. It was
found, as in previous tests, that
the most satisfactory listening
could be done when the extreme low
frequencies were suppressed.
Certain of these recordings were
made to demonstrate the effect of
the low frequencies, but they were
unsatisfactory due to overloading
conditions and may need repeating.

D16/R305 181
JASPER, H. N.

Comparative tests of Freed,
NDRC, and emergency battery holders
for AN/CRT-1 units.
Columbia Univ. - Div. of War
Research
Apr. 27, 1943 4p.

Resistance measurement tests
were conducted on three types of
battery holders, after which each
pack was disassembled and examined
mechanically. As indicated in the
accompanying table, the Freed
battery box proved superior and,
with slight improvements, is
recommended for use.

D16/R306 182
JASPER, H. N.

Inspection tests on 17 AN/CRT-1
units.
Columbia Univ. - Div. of War
Research
Apr. 28, 1943 4p.

Seventeen AN/CRT-1 units
received at Quonset Point Naval Air
Station were inspected and tested
by members of the New London
Laboratory, at Quonset. In
addition to antenna-current,
frequency, and audio-continuity
tests, a special audio-volume test
was performed to obtain additional
data on the overall response
uniformity of the units. The
results of the tests are summarized
and listed in detail in the
attached table.

D12/R307 183
PROUDFOOT, D. A.

Conference on harbor surveys.
Columbia Univ. - Div. of War
Research
Apr. 28, 1943 2p.

The purpose of the conference
held on April 26, 1943, was to
discuss the completion of the New
York harbor survey and the plans
for future survey work at Block
Island. Ambient-noise measurements
were performed in the survey.

D42/R308 184
KITTEDGE, C. P.

Temporary fire control for
Hedgehog.
Columbia Univ. - Div. of War
Research
Apr. 24, 1943 2p.

Unit No. 2 of the Gun-Train
Indicator, Mk 53, has been
completed and is ready to undergo
sea trials. Vibration tests
administered in Boston will be
necessary for any subsequent units.

D26/R309 185
HORTON, J. W.
Wellings attack computer.
Columbia Univ. - Div. of War
Research
Apr. 26, 1943 3p.

During a visit to the Naval Research Laboratory, the writer was shown a model of Wellings attack computer, which is a simple device for permitting a check to be kept on the bearing angle between a fictitious trailing point behind a destroyer and a submarine being attacked. Its purpose is to facilitate attacks by the constant bearing-angle method. The relations between the quantities mentioned are indicated by the equation on the attached sketch.

D26/R310 186
HORTON, J. W.
Modified bow scale plate for sound range recorder.
Columbia Univ. - Div. of War
Research
Apr. 29, 1943 9p.

The feature indicating the correct time to fire forward-thrown projectiles in anti-submarine attacks is the sound range recorder. Factors involved in the operation of this unit, as well as modifications and improvements to it, are discussed. Diagrams and graphs are also provided.

D16/R311 187
JASPER, H. N.
Type tests on AN/CRT-1 units.
Columbia Univ. - Div. of War
Research
May 8, 1943 12p.

Pre-flight tests were administered to 20 AN/CRT-1 units. Units considered deficient were adjusted or repaired before being subjected to additional tests, and

the new values of antenna current and frequency were recorded. Tables reflecting pre-flight and operation tests are attached.

D20/R312 188
STEPHENSON, R. G.
Automatic volume control for echo-ranging equipments, pros and cons.
Columbia Univ. - Div. of War
Research
May 6, 1943 3p.

In regard to the modification of the Mark I automatic volume control unit for the D-20 rack, three suggestions were made. The most logical of the three, a common gain control with common TVG, is the combination available in the TVG position of the Mark I AVC unit. However, if operator training is the primary consideration, the complete AVC system is the most appropriate.

D20/R313 189
STEPHENSON, R. G.
Development of AVC for the D-20 rack.
Columbia Univ. - Div. of War
Research
Apr. 30, 1943 22p.

The AVC unit described in the instruction manual, "Installation and Operation of NDRC Model I AVC Unit for NDRC Mark II D-20 Indicator-Amplifier-Control Unit for Types QC and WAA Echo-Ranging Equipment," has been under development at intervals since December 10, 1942. The job was assigned to devise some means of replacing the two gain controls of the SLC and 755 amplifiers by a single control to reduce the manipulation of gain controls during attack. Included are graphs and diagrams of the AVC unit.

D24/R314 190
CHAPMAN, R. Y.

Observations and operations of ship's noise aboard USS BALAO, Apr. 27, 1943.
Columbia Univ. - Div. of War Research
May 5, 1943 7p.

This memorandum refers mainly to the topside listening equipment installed on the submarine. Attached is a table of events, according to time and type of noise created by the ship itself, as heard through the headphones.

D16/R315 191
MACLAUGHLIN, R. R.

Tests on small straight magnetostrictive hydrophones constructed with electroformed shells.
Columbia Univ. - Div. of War Research
May 18, 1943 4p.

Tests using electroformed shells on magnetostrictive hydrophones were suggested because of the possibility that they may be more economical and easier to procure than those from rolled stock. Testing proved in favor of these shells; therefore, serious consideration should be given to adapt electroformed hydrophones.

D41/R317 192
SEELEY, E. S.

A case for Subsight.
Columbia Univ. - Div. of War Research
Apr. 26, 1943 6p.

This memorandum develops the conclusion that Subsight offers such promise for increasing the effectiveness of the anti-submarine Fleet that the New London Laboratory should continue the Subsight program with adequate

assignment of personnel and marine facilities. The net cost appears to be very small as compared to other means of increasing the effectiveness of the Fleet.

D16/R318 193
WAMBACH, A. G.

Conference on expendable radio sono buoy, ASWORG & New London Laboratory.
Columbia Univ. - Div. of War Research
May 1, 1943 2p.

The objectives of the conference were to form a closer relationship between the ORG and the New London Laboratory to stimulate an exchange of experiences and to formalize a procedure for keeping each other informed concerning the progress of the expendable radio sono buoy project.

D29/R319 194
MARTIN, G. W.

Sea trials, 7-40-M projectiles in combination with the chute and screw-type dispenser.
Columbia Univ. - Div. of War Research
May 10, 1943 3p.

Moving pictures were made of loading operations for the screw-type dispensers located at the stern of the ship. Dummy projectiles were used initially, followed by live units. However, during the testing, explosions occurred that caused officials to halt operations due to probable danger to the ship and personnel.

D16/R320 195
MASON, R. I.

Expendable radio sono buoy and
MAD submarine search test, April
23, 1943, Lakehurst, NJ.
Columbia Univ. - Div. of War
Research
May 5, 1943 8p.

A test was conducted, using the
blimp K-49 to navigate and attempt
to find the submarine USS HARDER
using radar, expendable radio sono
buoys, and MAD. ERSB's proved
their value on this test, which was
made under service conditions.
They verified the presence of a
submarine in a suspected area and
encouraged continuing search.
Also, the ERSB's acted as a guide
to direct the start of a successful
MAD search. A pattern-position
diagram is included.

D34/R321 196
MASON, R. I.

Comparative versus
discriminative sonic listening.
Columbia Univ. - Div. of War
Research
June 10, 1943 3p.

In comparative, as opposed to
discriminative, listening, one
listens for presence of the sound
of a submarine or other vessel
through quality and intensity
differences between two or more
hydrophones. It is ideally
applicable to radio sonic buoy
operations, but is only possible
when using multifrequency buoys.
It is to this method that the
writer attributes a great portion
of success for, during the many
hours of search, the stimulating
morale-lifting report of submarine
presence was only made possible
through comparative listening.

G1/R322 197
LOYE, D. P.

Propeller-noise measurements
aboard USS BALAO at various depths,
April 27, 1943.
Columbia Univ. - Div. of War
Research
May 7, 1943 7p.

Tests were conducted to
determine the amount of noise
produced by the submarine
propellers at various depths. The
tests indicated that cavitation
noise became less as the depth of
the submarine increased. Tables
and graphs are included in this
report.

D20/R337 198
ARNDT, W. F.

AVC installation in Mark II
D-20 indicator-amplifier-control
unit on USS EAGLE 38 at San Diego,
CA.
Columbia Univ. - Div. of War
Research
May 13, 1943 4p.

Results of the installation of
the Model I AVC modification unit
indicated that the slow AVC
threshold was too high, and the
slow AVC gain too high also. Both
were corrected. Other minor
difficulties were experienced and
corrected, resulting in a
successful performance.

G7/R324 199
HERRNFELD, F. P.

Test on Western Electric
D-126001 transformer.
Columbia Univ. - Div. of War
Research
May 7, 1943 5p.

This memorandum discusses test
results of the Western Electric
D-126001 transformer for possible
use on the expendable radio sono
buoy. Accompanying this report are
four frequency curves.

D45.2/R325 200
GERJUOY, E.

Noise discrimination in the
WEA-1 installation.
Columbia Univ. - Div. of War
Research
Apr. 16, 1943 4p.

Discussed in this report is the
importance of improvement of WEA-1
performance, which demands
reduction of extraneous acoustic
noise. It is suggested that an
experiment, mounting the WEA-1 gear
on a boat that is capable of moving
rapidly through the water with its
screws turned off, would be the
best approach to the situation.
Noise reduction would greatly
improve the signal-to-noise ratio
and increase the range of the WEA-1
gear.

D40/R326 201
GILLET, G. D.

Conversion program for
maintenance of true-bearing
training.
Columbia Univ. - Div. of War
Research
May 8, 1943 9p.

The purpose of this memorandum
is to set down the present status
of the program for the conversion
of the various existing types of
echo-ranging equipment. This would
provide the maintenance of the
true-bearing feature with the
compass card remaining on the
central moving dial as required by
the recent order of the Navy
Department.

D29/D23/R327 202
GOURLEY, G. M.

7-40-M blimp tests, Lakehurst,
NJ.
Columbia Univ. - Div. of War
Research
May 11, 1943 2p.

In conjunction with blimp tests
of the D101 bomb rack, sixteen
7-40-M live fuzes were prepared to
be dropped in 14 Torpex-loaded and
2-plaster-loaded bombs. All bombs
were dropped singly. No sticks or
patterns were attempted on the
test. Operation of the D101 bomb
rack on this test will be covered
in a later report.

D34/R330 203
MANINGER, R. C.

Listening tests on May 4, 1943,
of hydrophone for directional radio
sono buoy.
Columbia Univ. - Div. of War
Research
May 8, 1943 3p.

Directional radio sono buoy
hydrophone tests resulted in an
unacceptable performance status
because of the buoy's lack of
low-frequency response. It was
also noted that there was a
distinct advantage in having very
little directionality at low
frequencies because this aided in
determining that a signal was
present. It did not hinder bearing
determinations utilizing the high
frequencies.

D45/R331 204
GRIFFIN, R. H.

Coupling of WEA-1 projector to
WEA echo-ranging equipment.
Columbia Univ. - Div. of War
Research
Aug. 19, 1943 2p.

Preceding the coupling of the
WEA-1 projector to WEA echo ranging
equipment, tests and observations
were made. The schematic attached
shows the necessary modifications
to be made when the WEA-1 projector
is used with the WEA stack.

G1/R333 205
TEAL, E. E.

Sonic listening and recordings of sounds from USS BALAO during deep submergence tests, April 27, 1943.

Columbia Univ. - Div. of War Research
May 12, 1943 6p.

Overside training gear was installed on the afterdeck of USS MARTHA's VINEYARD, with a C-37 4-ft crystal hydrophone, an NL 102 amplifier, and recording equipment. Submarine noises were recorded several times on most of the 13 records obtained, but a significant difference in noise level was not evident at the end of the test versus the level prior to deep submergence. Logs for sonic listening are attached.

D12/R334 206
HOFF, H. B. and WAGNER, R. A.

Attenuation-equalizing pads and terminating networks for nonloaded No. 107 P-type cable.
Columbia Univ. - Div. of War Research
May 13, 1943 2p.

A compilation of the values of the electrical components to be employed with nonloaded No. 107-P cable is attached to this report on attenuation-equalizing pads and terminating networks.

G1/R335 207
LOYE, D. P.

Propeller-noise measurements aboard USS BALAO at various depths, April 27, 1943.
Columbia Univ. - Div. of War Research
May 13, 1943 7p.

Propeller-noise measurement tests were made by personnel of the New London Laboratory with a

Ballantine meter and associated equipment. Differentials, as indicated in the attached tables, appeared to be minor in character.

D34/R336 208
MANINGER, R. C.

Listening tests on May 6, 7, and 8, 1943, of hydrophone for directional radio sono buoy.
Columbia Univ. - Div. of War Research
May 11, 1943 2p.

Listening tests were carried out south of Fishers Island using the USS S-20 running 200 rpm at periscope depth as a target. An accompanying table indicates the results of the tests.

D20/R338 209
ARNDT, W. F.

Mark II-D-29 echo-ranging equipment as installed on USS EAGLE 38 at San Diego, CA.
Columbia Univ. - Div. of War Research
May 19, 1943 4p.

This report describes the installation of D-20 echo-ranging equipment in a step-by-step procedure, outlining problems encountered. Taken as a whole, the installation was a success.

G13/R339 210
GRIFFIN, R. H.; HANCOCK, J. O. and SEELEY, E. S.

WEA-1 investigation.
Columbia Univ. - Div. of War Research
Apr. 30, 1943 v.p.

The purpose of this memorandum is to describe the work done and results obtained in the WEA-1 study since the last report (G13/R198, March 5, 1943). Tables, graphs, and photos are included.

D44/R340 211
SEELEY, E. S.

Discussion at May 5, 1943,
conference at Harvard on impulse
excitation and rapid-scanning
methods.

Columbia Univ. - Div. of War
Research
May 13, 1943 3p.

Discussions at the Harvard
University conference involved the
utility of impulse excitation
(pinging by discharging a condenser
into a resonant projector). Good
echoes at long ranges have been
obtained with the ship at rest, but
when underway and in the presence
of noise, results were much worse.
Indications are unfavorable for use
of this method. A more promising
method discussed was that of a
rapid scanning system intended for
use in attack, rather than search.

D38/R341 213
HERRNFELD, F. P.

NL-107 power supply.
Columbia Univ. - Div. of War
Research
May 18, 1943 3p.

The NL-107 power supply is
described fully in this report.
The circuit is shown on the
attached drawing, No. 12910BE, data
on regulation and noise voltages of
the power unit on curve #C170.1.

D38/R342 214
HERRNFELD, F. P.

NL-106 power supply.
Columbia Univ. - Div. of War
Research
May 18, 1943 3p.

The NL-106 power supply is
described fully in this report.
The circuit is shown on the

attached drawing, No. 12925BE.
Data on regulation and noise
voltages of the power unit are
shown on curve #C170.2.

D24/R343 215
HERRNFELD, F. P.

AC-operated topside listening
amplifier.
Columbia Univ. - Div. of War
Research
May 20, 1943 6p.

Electrical specifications for
the 12933BE amplifier, designed for
topside sonic listening, are
included in this memorandum. This
particular amplifier has four
stages of voltage amplification.

D13/R344 216
HERRNFELD, F. P.

Oscillator (125 kc) for use
with high fidelity tape recorder.
Columbia Univ. - Div. of War
Research
May 17, 1943 3p.

Electrical specifications for
the 125-kc oscillator are included
in this report. This oscillator
has been designed for use with a
high-fidelity tape recorder.

P35/R345 217
HERRNFELD, F. P.

Bridge detector.
Columbia Univ. - Div. of War
Research
May 20, 1943 8p.

A tuned amplifier, per Drawing
No. 12298AE, was designed as a
bridge accessory for the
Electronics Design Group.
Specifications and curves are
included in this report.

D24/R346 218
HERRNFELD, F. P.
Test listening amplifier.
Columbia Univ. - Div. of War
Research
May 21, 1943 11p.

Electrical specifications for
the 12277CE amplifier, designed for
sonic and ultrasonic listening, are
included in this report. The
amplifier consists of 2 two-stage
resistance-coupled amplifiers in
tandem, a volume indicator, an
oscillator, and several filter
networks.

D24/R347 219
HERRNFELD, F. P.
Supersonic converter-amplifier.
Columbia Univ. - Div. of War
Research
May 20, 1943 v.p.

Electrical specifications for
the supersonic converter-amplifier,
designed to provide listening
facilities in the supersonic region
with a magnetostrictive hydrophone,
are included in this report. Also
included are photos and curve
information.

D34/R348 220
SNOW, W. B.
Listening tests in PBV.
Columbia Univ. - Div. of War
Research
May 18, 1943 3p.

The purpose of the listening
tests was to determine how
effectively personnel in an
airplane can listen to various
types of directional hydrophones.
Four types of hydrophones were
tested and comments on the
performance of each were expressed.

D34/R349 221
MANINGER, R. C.
Listening tests on May 14,
1943, of hydrophone for directional
sono buoy.
Columbia Univ. - Div. of War
Research
May 19, 1943 3p.

Listening tests of directional
sono buoy hydrophones were carried
out south of Fishers Island using
AMADA, USS S-20, and a PBV plane.
Four hydrophones underwent
observations and performance
descriptions of each are given.

D12/R350 222
HOFF, H. B.
Notes on conference on
cable-connected hydrophones, held
on May 11, 1943, at the U. S. Navy
Underwater Sound Laboratory, New
London, Connecticut.
Columbia Univ. - Div. of War
Research
May 13, 1943 4p.

This conference was held to
discuss the recommendations
advocating the omission of loading
on future cable-connected
hydrophone installations and also
to discuss improvements in the
associated listening amplifiers.

G27/R351 223
HERRNFELD, F. P.
Sonic listening amplifier.
Columbia Univ. - Div. of War
Research
May 18, 1943 7p.

Electrical specifications for
the sonic listening amplifier
(12250-AE), designed for listening
with magnetostrictive hydrophones,
are included in this report. The
amplifier is operated from
self-contained batteries. Also
attached are frequency curves.

D12/R352 224
HERRNFELD, F. P.
Sound bell.
Columbia Univ. - Div. of War
Research
May 21, 1943 1p.

A sound bell to be used in harbor surveys was designed and partially constructed. Unforeseen mechanical difficulties prolonged its construction to such an extent that other means were found for making the surveys. The construction was, therefore, discontinued.

G27/R353 225
GERJUOY, E.
Measurements of AX-58 hydrophones.
Columbia Univ. - Div. of War Research
May 21, 1943 19p.

Six AX-58 Brush crystal hydrophones were constructed to accommodate a preamplifier which was designed as unit No. 3343. The preamplifier was designed to be used with either 9001 or 6SJ7. The acoustic measurements did not indicate any particular advantage in favor of either tube type, however. Included in this report are numerous frequency curves.

D41/R354 226
GERJUOY, E.
Measurements on CH-10 No. 384 crystal transducer.
Columbia Univ. - Div. of War Research
May 22, 1943 3p.

Measurements described in this report were performed on the CH-10 No. 384 crystal transducer. The data also include recorder curves.

G29/R355 227
HANSON, R. O. and HERRNFELD, F. P.
Artificial echo repeater.
Columbia Univ. - Div. of War Research
May 24, 1943 4p.

Electrical specifications for the artificial echo repeater, consisting of a 24-kc oscillator and a time-delay network with range scales calibrated in yd, are included in this memorandum.

G27/R356 228
HERRNFELD, F. P.
Regulated power supply.
Columbia Univ. - Div. of War Research
May 21, 1943 v.p.

Specifications for a regulated power unit for the AX-58 hydrophones are included in this memorandum. Also attached are numerous frequency curves.

G12/R357 229
SNOW, W. B.
Record of conference.
Columbia Univ. - Div. of War Research
May 22, 1943 2p.

The subject of the discussions in this conference was the AX-58 hydrophone which the Brush Company and the New London Laboratory have been developing jointly for the underwater sound-level meter. This memorandum records the decisions made during the visit to the Laboratory by a representative of the Brush Development Company.

D46A/R358

230

PROUDFOOT, D. A.

Inspection of vessels and preliminary arrangements for Miami Ambient Noise Survey.

Columbia Univ. - Div. of War Research

May 24, 1943 5p.

The purpose of this memorandum is to record for reference certain arrangements made concerning four vessels and other items necessary to the undertaking of the Miami Ambient Noise Survey. The vessels inspected were USS LUSTER (IX-82), USS EUHAW (IX-85), USS SALUDA (IX-87), and USS ROMAIN (IX-89).

D42/R359

231

Fire-control equipment, Gun-Train Indicator, Mk 53 Mod 1, installation, operating, and maintenance instructions (preliminary).

Columbia Univ. - Div. of War Research

May, 1943 v.p.

Compiled in this report on the installation, operating, and maintenance instructions for the Mark 53 gun-train indicator are numerous diagrams, photos, and blueprints.

D24/R360

232

LOYE, D. P.; WILLIAMS, H. C.; and CHAPMAN, R. Y.

Sonic and supersonic tests aboard submarine USS S-20, May 8, 1943.

Columbia Univ. - Div. of War Research

May 15, 1943 4p.

The purpose of the sonic and supersonic listening tests was to determine the relative merits of the 2-ft toroidal hydrophone as compared to the 3-ft straight wood-core hydrophone with a

streamlined baffle. A trial of sonic listening using the JK crystal head was also made. Results of the tests are indicated in the memorandum and specifications of the hydrophones are given.

G1/R361

233

LOYE, D. P.; MANINGER, R. C.; HOFF, H. B.; and TATUM, A. K.

Supplement to Key West submarine and water-noise measurements (G1/R300).
Columbia Univ. - Div. of War Research
June 25, 1943 9p.

This report is a supplement to Report No. G1/R300 (176) and was prepared to present photographs of the equipment installation and data on ambient noise related to sea state, as adjusted to conform with Beaufort Wind and Weather Scale and International Sea and Swell Scales employed in oceanographic work.

D16/R362

234

NEFF, W. D.

Comparative listening tests.

Columbia Univ. - Div. of War Research

May 28, 1943 7p.

The purpose of the tests proposed in this memorandum is to obtain a comparison of two methods of listening which may be used with the expendable radio sono buoy. The procedure is outlined in detail on attached diagrams.

D46A/R364 235
WAGNER, R. A.
Notes on conference regarding
cruise #5 of USS SALUDA.
Columbia Univ. - Div. of War
Research
Aug. 18, 1943 2p.

Inshore and deep-water
measurements were the subject of
the conference discussed in this
memorandum. An outline of the
measurements is included.

D16/R365 236
BARKSON, J. A.
Operational tests at Quonset
Point Naval Air Station.
Columbia Univ. - Div. of War
Research
May 29, 1943 2p.

This memorandum covers the
results of operational tests of
Expendable Radio Sono Buoy
AN/CRT-1. Each of the 22 units
tested performed satisfactorily,
resulting in a successful operation.

D17/R367 237
TATUM, A. K.
Notes on JK listening tests,
May 22, 1943.
Columbia Univ. - Div. of War
Research
May 31, 1943 2p.

This memorandum describes the
JK listening tests made aboard USS
S-20 in area Baker south, operating
submerged at periscope depth. Due
to various malfunctions of the
equipment, further tests are being
planned.

D24/R368 238
LOYE, D. P.; WILLIAMS, H. C.; and
TATUM, A. K.
Supersonic listening tests
aboard USS S-20, May 22, 1943.
Columbia Univ. - Div. of War
Research
May 31, 1943 2p.

This memorandum describes a
comparison test of supersonic
listening made aboard the USS S-20
operating in area BAKER south using
two types of amplifiers; one
amplifier was the NL-105 with a
supersonic converter and the other
a portable amplifier designated as
test listening amplifier. Due to
discrepancies in signal
transmission, it was felt that this
test was not sufficient to reach
any satisfactory conclusion and
further tests are being planned.

D38/R369 239
TEAL, E. E.
Preliminary test of
through-the-hull listening
equipment on USCGC MADALAN.
Columbia Univ. - Div. of War
Research
May 31, 1943 2p.

A sound log of the newly
installed through-the-hull
listening equipment accompanies
this memorandum. The sound
operator indicated that the
performance of the equipment
encouraged its use on ships the
size of the USCGC MADALAN and
larger. Further tests are planned
for a later date.

D46A/R370 240
HERRNFELD, F. P.
12950-BE amplifier.
Columbia Univ. - Div. of War
Research
June 1, 1943 5p.

Electrical specifications for the 12950-BE amplifier for the Miami area ambient-noise survey are included in this report. The amplifier has a dual gain control and input connector on the front panel. The output and power terminals are on the rear of the chassis. Frequency curves and a blueprint of the amplifier also are included.

G21/R371 241
HERRNFELD, F. P.

Receiving tube characteristics.
Columbia Univ. - Div. of War
Research
May 31, 1943 v.p.

The data in this report were compiled to serve the New London Laboratory as an addition to the RCA Tube Handbook. Nine of the most common voltage amplifier triode and pentode tubes are covered in the report. As many as 10 tubes of one type were tested before an average tube was chosen and complete data taken. Also included are numerous frequency curves.

D34/R372 242
MANINGER, R. C.

Conference on D-34 listening tests.
Columbia Univ. - Div. of War
Research
June 2, 1943 2p.

The average results of the listening tests of hydrophones for the directional radio sono buoy are presented in this report. On the basis of these tests, the 2-ft hydrophone was definitely the best as far as the acoustics were concerned.

D24/R373 243
CHAPMAN, R. Y.

Sonic and supersonic tests aboard submarine USS S-16, May 18, 1943.
Columbia Univ. - Div. of War
Research
June 3, 1943 3p.

The sonic and supersonic listening tests were conducted to determine the relative merits of the supersonic converter amplifier and the 12277-CE amplifier, designed to provide listening facilities in the supersonic region with a magnetostrictive hydrophone. Performance of the toroidal 4-ft straight hydrophone at sonic frequencies was comparable to that of the 3-ft. However, it possessed sharper and more accurate bearings on several targets. In spite of these differences, it was disclosed that there was no apparent difference in their quality of operation.

D38/R374 244
MANINGER, R. C. and TATUM, A. K.

Comparative listening tests of through-the-hull sonic and supersonic and QBC sonic and supersonic listening equipment.
Columbia Univ. - Div. of War
Research
June 23, 1943 18p.

Comparative listening tests of the through-the-hull sonic and supersonic equipment and the NRL QBC equipment, in which sonic and supersonic listening and echo-ranging facilities are combined in one unit, were made to determine the useful range of these equipments for listening detection of a submarine running at periscope depth. Numerous curves also are included in this report.

D34/R375 245
MANINGER, R. C.
Listening tests on May 28,
1943, of hydrophone for directional
sono buoy.
Columbia Univ. - Div. of War
Research
June 2, 1943 2p.

Testing of hydrophones for use
with the directional radio sono
buoy was carried out south of
Fishers Island using AMADA and USS
S-16. It was the majority opinion
that the 2-ft hydrophone was
superior to the others.

D16/R376 246
JASPER, H. N.
Type tests on AN/CRT-1 units,
second group.
Columbia Univ. - Div. of War
Research
May 19, 1943 16p.

Complete inspection and type
tests were made on a group of 20
AN/CRT-1 units manufactured by
Freed Radio Corp. under U. S. Army
contract. Manufacturing changes
initiated as a result of these
tests are included in this report.
Tables of these results are
available also.

D16/R377 247
BARKSON, J. A.
Visit to Emerson Radio &
Phonograph Corp., Thursday, May 27,
1943.
Columbia Univ. - Div. of War
Research
June 4, 1943 2p.

This memorandum covers items
discussed regarding an experimental
redesigned expendable radio sono
buoy.

D34/R378 249
BARKSON, J. A.
Expendable radio sono buoy
pattern operation with
single-frequency and
multiple-frequency methods,
AN/CRT-1 and AN/ARK-3 equipments.
Columbia Univ. - Div. of War
Research
June 4, 1943 17p.

The present multiple frequency
item of operation of Expendable
Radio Sono Buoy AN/CRT-1 equipment,
using the AN/ARR-3 receiving
equipment as now being
manufactured, had demonstrated that
it can be of definite value in
aircraft anti-submarine warfare.
Deliveries in quantity are just
beginning. It is believed that
main emphasis should be placed
first on using these equipments to
the best advantage along tried and
proven lines without changes.

D20/R379 250
ARNDT, W. F.
Elimination of background noise
in the Mark II Serial #4 rack.
Columbia Univ. - Div. of War
Research
June 4, 1943 3p.

Due to problems with the Mark
II racks meeting Navy
background-noise specifications,
certain modifications to the
equipment were necessary. With
changes made, the noise level of
the rack was -6 dB with the input
selector switch set on "BDI" and -8
dB with the input selector switch
set on "QC", hence meeting the
requirements.

D23/R380 251
SETTERHOLM, V. M.
Mark 53 bomb rack (for the Mark
52 A. S. bomb).
Columbia Univ. - Div. of War
Research
Sept. 29, 1943 10p.

Work commenced on the racks for the 6-40 and 7-40 bombs in April, 1943, and successive experimental racks were tested at Lakehurst N.A.S. Early in May, 1943, the final tests were made on the rack and it was found to be satisfactory. As a result of this development, production commenced on 20 racks at the Naval Gun Factory, Washington, D.C., under the direction of BuOrd. The rack, as manufactured, will dispense the Mark 52 A.S. bomb, heretofore referred to as the 7-40 bomb, equipped with the Mark 140 fuze. This is the HIR-3 fuze developed at the California Institute of Technology. Photos accompany this report.

D15/R381 252
JASPER, H. N. and CLEARWATERS, W. L.
Necessary AN/CRT-1 electrical improvements, Expendable Radio Sonic Buoy.
Columbia Univ. - Div. of War Research
June 12, 1943 12p.

In connection with type tests on AN/CRT-1 transmitters, it was found that a wide variation existed in the frequency-response curves of different transmitters. This memorandum describes (using diagrams) a simple modification of the first-stage input circuit from the present construction to the improved construction, which greatly reduces the variations in high-frequency response due to different tubes. These changes will greatly improve the usefulness of the buoys under service conditions.

D24/R382 253
SNOW, W. B.
Conference on supersonic listening converter.
Columbia Univ. - Div. of War Research
June 8, 1943 2p.

This conference involved discussions of future plans for applying supersonic listening to the JP-1 sound receiving equipment for topside listening on submarines. Tests have shown that the super-heterodyne converter type of attachment to the NL-105 amplifier has certain advantages over the simpler fixed-band type; therefore, this device is recommended for further development. It is not to be expected that a quick change from topside to JK listening will be required, however.

D28/R383 254
KITTEDGE, C. P.
Intervalometer.
Columbia Univ. - Div. of War Research
June 7, 1943 3p.

The intervalometer has been developed for releasing fast-sinking A/S projectiles from triple unit gravity-operated dispensers. Photos and blueprints are included in this report.

G8/R384 255
List of documents issued by the New London Laboratory July 1, 1942, to July 1, 1943.
Columbia Univ. - Div. of War Research
July 1, 1943 28p.

This report contains a listing of documents issued by the New London Laboratory from July 1, 1942 to July 1, 1943. Also included are formal memoranda distributed by NDRC, as well as specifications, operation, installation, and maintenance manuals, biweekly, comprehensive, interim, progress, status, and patent reports. The total number of documents issued is 465.

D16/R385 256
Specification for cylindrical
magnetostrictive hydrophone, Model
D-16 Mark V.
Columbia Univ. - Div. of War
Research
June 16, 1943 11p.

This specification covers the
requirements for a cylindrical
hydrophone of the magnetostrictive
type equipped with an extension
tube on which the attached cable
can be coiled. Included also are
numerous blueprints on the makeup
of the unit.

D20/R386 257
ARNDT, W. F.

Reduction of background noise
in the Mark II rack, supplement to
memorandum for file, D20/R379.
Columbia Univ. - Div. of War
Research
June 9, 1943 1p.

This memorandum is in addition
to memorandum for file D20/R379-250
and adds information regarding the
reduction of background noise of
the Mark II rack which was
installed on USS EAGLE. In this
instance, an additional choke and
condenser filter were installed in
the plate supply to the RF tubes of
the BDI chassis. This filter
reduced the noise, as measured in
the 755 amplifier output meter, by
approximately 10 dB.

P20/R387 258
SNOW, W. B.

Merchant-vessel protection.
Columbia Univ. - Div. of War
Research
June 8, 1943 3p.

At a conference on May 18,
1943, it was decided that the New
London Laboratory would do enough
work on merchant-vessel protection
to make possible a statement to the

Maritime Commission as to what
might be done toward a solution to
this problem. The program,
concerned with listening, was
broken down into (1) measurements
of the noise output, (2) using the
through-the-hull
gear, and (3) equipment for
obtaining a rotating spot on a
cathode-ray tube.

D16/R388 259
FISH, P. E.

First sea-search attack group
anti-submarine training maneuvers,
Boca Chica Field, Key West, FL,
May 19 to 26, 1943.
Columbia Univ. - Div. of War
Research
June 10, 1943 3p.

Equipment was used for the
field training under conditions as
closely simulating combat nature as
possible for training purposes.
This included radar, MAD, magnetic
bomb sight, expendable radio sono
buoys, retrofiring float lights,
fluorescein in dye slicks,
automatic slick dropper, and
retrofiring ordnance. Operations,
however, were interrupted and
discontinued due to mechanical
failures aboard the submarine.

D16/R389 260
SUTER, H.

Conference on expendable radio
sonic buoy design.
Columbia Univ. - Div. of War
Research
June 5, 1943 3p.

This memorandum discusses
various aspects of the expendable
buoy projects. Problems
encountered with the development of
the present AN/CRT-1 buoy were also
aired; however, most have been
corrected. During this conference,
the question of optimum hydrophone
depth was being studied.

D38/R390 261
GRAHAM, W. F.
Noise measurements on USCGC
MADALAN.
Columbia Univ. - Div. of War
Research
June 10, 1943 7p.

Noise measurements were made with through-the-hull listening equipment installed on USCGC MADALAN to determine the effects of ship speed, operations of the engine, and auxiliaries on total measured noise. Each of the ship's two generators increased the overall noise level by 3 dB at zero speed with the engine stopped. At maximum speed of the ship, with the engine stopped as well as with the engine running, neither generator caused any appreciable change in total noise. Frequency curves are included in this report.

D24/D38/R391 262
LOYE, D. P. and MANINGER, R. C.
Comparative tests on submarine and surface-craft listening equipments.
Columbia Univ. - Div. of War Research
Sept. 10, 1943 v.p.

At the request of BuShips, laboratory measurements and comparative listening tests on several sonic listening systems were made to determine the difference in their general characteristics. The tests were divided into two categories: (1) laboratory measurements of amplifier and hydrophone characteristics, and (2) comparative listening tests at sea. Numerous photos, frequency curves, appendices, and diagrams are included in this report.

D43/D20/R392 263
ARNDT, W. F.
Testing means for QC echo-ranging indicator-amplifier-control units being manufactured by the Submarine Signal Company and the RCA Manufacturing Company.
Columbia Univ. - Div. of War Research
June 11, 1943 4p.

This report emphasizes the necessity for a convenient testing and checking means being made available with each echo-ranging system. One suggestion was to provide a set of standard voltages which could be impressed on the input terminals of the BDI and/or the audio amplifier.

D20/R395 264
SHAFFER, W. G.
Mark II D-20 console-type receiving rack, as installed on USS PC-451 at Key West, FL.
Columbia Univ. - Div. of War Research
June 1, 1943 4p.

This memorandum deals with the installation of a Mark II D-20 receiving rack aboard USS PC-451 and the tests made subsequently with the equipment. It was the opinion of the ship's officers and sound-school officers that the installation was successful with the exception of automatic volume control. This would be corrected, however.

D13/R396 265
HANSON, R. O.
Transcription turntables.
Columbia Univ. - Div. of War Research
June 16, 1943 5p.

At the request of the Expendable Radio Sono Buoy Group, three transcription turntables have been submitted for testing to determine their frequency characteristics, power output, and general performance. A general description of each unit is provided in this report.

Manufacturers are (1) Presto L₂ transcription turntable; (2) L. M. Sandwich Associates, Model MC 364 transcription player; and (3) David Bogen, Inc., Model PT 16. The L. M. Sandwich unit proved to be superior; however, if it is purchased, the reproducer and arm must be replaced with a Brush PL-20. Frequency curves are also included in this report.

G8/R397 266
Index to documents issued by the New London Laboratory, July 1, 1942, to July 1, 1943.
Columbia Univ. - Div. of War Research
July 1, 1943 38p.

The documents listed in this index are those concerning Projects D3 (Anchored Sono Radio Buoys) through D46A (Ambient-Noise Surveys, Miami Area). Memoranda, patent reports, and biweekly reports are also included.

D20/D43/R399 267
SAWYER, C. R.
Harvard demonstrations, May 26, 1943, and conferences with LCDR Bennett.
Columbia Univ. - Div. of War Research
May 31, 1943 4p.

Extensive operations were planned by Harvard to demonstrate developments of equipment for proposed use in the echo-ranging systems being designed by the RCA and Submarine Signal companies. The units demonstrated were (1)

Own-Doppler Nullifier (ODN), (2) the reverberation filter and reverberation controlled gain (RCG), and (3) the automatic target training (ATT).

D16/R400 268
JASPER, H. N.
Investigation of four defective expendable radio sono buoys, type AN/CRT-1.
Columbia Univ. - Div. of War Research
June 14, 1943 v.p.

Twenty AN/CRT-1 units out of a shipment of 24 received at Quonset Point Naval Air Station operated in a satisfactory manner. Of the remaining four, two were found to be unsatisfactory in preflight tests and two were defective when tested in the aircraft preparatory to launching. After repair, the units were returned to Quonset. Frequency curves and a photo of a modified AN/CRT-1 unit are included.

A3/R402 269
Outline of items for program discussion.
Columbia Univ. - Div. of War Research
June 23, 1943 8p.

The topic of this memorandum is the program outline for anti-submarine warfare. Items in this outline include (1) detection and location gear for combat vessels, (2) detection and location gear for aircraft, (3) listening gear for patrol craft, (4) gear for submarines, (5) gear for dirigibles, (6) harbor protection devices, (7) gear for merchant vessels, (8) searching gear for helicopters, (9) ordnance, (10) developmental research, (11) supplementary services, (12) cooperation with field engineering

group, (13) cooperation with operational research group, and (14) preparation of training equipment and instruction material.

D16/R403 270
FISH, P. E.

Report of live missions at Langley Field by first sea-search attack group.
Columbia Univ. - Div. of War Research
June 24, 1943 4p.

This report discusses two live missions with details of submarine searches with radio sono buoys. Also included in the memorandum is a diagram indicating reported sub-sighting and buoy locations. It also shows the dimensions of the pattern used. Actual detection of the enemy submarine was not accomplished, however.

D20/R404 271
HULTGREN, H. I.

Mechanical design of the Mark II rack.
Columbia Univ. - Div. of War Research
June 23, 1943 3p.

This memorandum discusses difficulties that were experienced during the design and construction of the Mark II rack. For the sake of showing the rack, and to verify the improved functional design within the time limitations set, resorting to model-shop practices, rather than manufacturing practices, was necessary.

D40/R406 272
HAYNES, J. B.

Development of maintenance of true-bearing feature.
Columbia Univ. - Div. of War Research
June 25, 1943 v.p.

This report stresses the need for maintenance of true bearing, to be implemented as of July, 1943, into all new echo-ranging equipment. It is believed that this development will effect a major improvement in this equipment, as available for the use of the Navy. Also included in this memorandum are photos and drawings.

G1/R407 273
SNOW, W. B.

Proposed listening tests.
Columbia Univ. - Div. of War Research
May 22, 1943 7p.

The question of actual increase in detection range produced by directive compared with nondirective listening is discussed in this report. The attached diagram illustrates the equipment setup with which the tests could be made on AMADA. Various features are included to make possible a wide variety of tests, and any one test may require only part of the illustrated equipment. Results indicated that none of these tests showed directly the advantage of the directive system in a location where there is ship or other interference.

G12/R408 274
GERJUOY, E.

Measurements of AX-50 hydrophones.
Columbia Univ. - Div. of War Research
June 30, 1943 v.p.

Measurements have been completed on six AX-50 and four AN-50-A hydrophones. Results of the measurements are summarized in the attached curves, which also include calibration curves for all 10 units. The results indicate no significant difference in

performance between the AX-50 and AX-50-A types. The latter differs only in the use of "defective" crystals in the AX-50-A hydrophone.

D42/R409 275
NOYES, E. E.

Shaketable test of Gun-Train Indicator, Mk 53 Mod 1.
Columbia Univ. - Div. of War Research
July 2, 1943 2p.

This memorandum discusses a production sample of the Mark 53 Model 1 gun-train indicator which was given a shaketable test at the Harvard University Underwater Sound Laboratory, Cambridge, MA. Pertinent data observed during this test are included in the report.

D38/R410 276
GRAHAM, W. F.

Noise measurements on CGR 3080.
Columbia Univ. - Div. of War Research
July 1, 1943 v.p.

Noise measurements were made with through-the-hull listening equipment installed on CGR 3080 to determine the effects of ship speed and operation of the engine on total measured noise. The data are shown in both rectangular and polar graphs. In all cases, the curves show relative average energy per cycle of total measured noise, which includes background noise.

D24/R411 277
GLENNAN, T. K.
D24.
Columbia Univ. - Div. of War Research
July 3, 1943 3p.

A discussion with the Astatic Corp. on the progress of the

topside listening gear was the topic of this memorandum. Included in the progress report were the status of the following: amplifier, baffles, headphones, loudspeakers, power supply filters, top flange adapter castings, and headphones. Certain modifications were indicated to be necessary in production.

D41/R412 278
PETIT, F. W.

Firing circuits and equipment for Mousetrap.
Columbia Univ. - Div. of War Research
July 7, 1943 4p.

Fundamental shortcomings of the component parts for Mousetrap were analyzed to determine whether they could contribute to failure under field conditions. Three areas where modifications were necessary were (1) inadequate power supply, (2) lack of supervision of circuits, and (3) vulnerable "safety" plug, normally exposed, handled during operation.

D40/D45/R413 279
GILLET, G. D.

Conference with LCDR Rawson Bennett concerning MTB and Servo development program.
Columbia Univ. - Div. of War Research
June 29, 1943 2p.

In reference to MTB for WEA-1, LCDR Bennett stated that the final design of the actual units would have to be held in abeyance until BuShips had decided what type of compass installation should be made on the small boats in which the WEA-1 gear is to be installed. Regarding further development of the AC servo control, he suggested that this work be continued and completed.

D34/R414 280
MASON, R. I.

Tests of a laboratory model
directional sono radio buoy.
Columbia Univ. - Div. of War
Research
July 8, 1943 2p.

This report covers two tests
with a rough model of an expendable
directional radio sono buoy. These
tests proved that a simple buoy may
be made a practical device. Making
the packaging of such a device
acceptable for aircraft use is the
next objective.

G20/R415 281
MARKHAM, J. J.

June conferences held at Woods
Hole Oceanographic Institution.
Columbia Univ. - Div. of War
Research
June 30, 1943 5p.

Topics of the conferences
included the following: analyses
of bottom samples taken in Block
Island Sound, the method of
handling bathythermograph (BT)
slides taken in the Atlantic Ocean,
the general problem of sound
transmission, a sound-level
recorder attached to QC equipment,
the classification of all BT slides
and all hydrographic data taken in
the Atlantic, and seasonal
variations of sound transmissions.

D45/D40/R416 282
SAWYER, C. R.

Schedule of WEA-1
investigation, USS SC 665.
Columbia Univ. - Div. of War
Research
Aug. 20, 1943 2p.

This memorandum provides a
schedule applying to the
investigation and development of
seaboard equipment, electronic
changes, and MTB training control

facilities for the WEA-1 system, as
well as appraisal tests of the new
QCU echo-ranging system.

D24/R417 283

Preliminary manual,
installation, operation, and
maintenance of JP-1 sound receiving
equipment (topside sonic listening
equipment).
Columbia Univ. - Div. of War
Research
Sept. 1, 1943 v.p.

This preliminary manual covers
all areas of the JP-1 sound
receiving equipment, namely,
hydrophone and baffle assembly,
adapter flanges, amplifiers, dc
power-supply filters, headphones,
and loudspeakers. Photos,
diagrams, drawings, and frequency
curves are also included.

P-35/R418 284
WESTNEAT, A. S.

Test report on Brush.
Development Company JQ amplifier.
Columbia Univ. - Div. of War
Research
June 28, 1943 v.p.

This memorandum describes the
performance of the Brush
Development Company JQ amplifier,
type CBD 50137, serial 1, in the
audio-frequency range from 100 to
20,000 cycles per second. The
results indicated that the
sensitivity was less than that with
amplifiers presently in use with
"JK heads". The signal-to-noise
ratio obtainable may not be
sufficient when low water noises
are encountered. The frequency
response and power output should
prove satisfactory when properly
used. Numerous frequency curves
are included in this report.

D20/D40/R419 285
Installation and operation of revised MTB unit for Mark II rack on USS PC-451 at Key West, FL. Columbia Univ. - Div. of War Research
July 9, 1943 6p.

The new maintenance of true bearing (MTB) unit, with associated changes and additions described in this manual, is to be installed as a replacement in the Mark II echo-ranging equipment. Blueprints are provided with the manual.

D20/D40/R420 286
Installation and operation of revised MTB unit for Mark II rack on USS EAGLE 38 at San Diego, CA. Columbia Univ. - Div. of War Research
July 10, 1943 6p.

The new maintenance of true bearing (MTB) unit, with associated changes and additions described in this manual, is to be installed as a replacement in the Mark II echo ranging equipment. Blueprints are provided with the manual.

G1/R421 287
MANUAL - Instructions and use of bathythermograph for a short survey or tests. Columbia Univ. - Div. of War Research
July 12, 1943 10p.

This manual provides instructions for use of the bathythermograph (BT). A standard technique has been developed for using the BT when a vessel is underway. This technique requires elaborate equipment and extensive training. These instructions, however, apply only for lowering the BT when the ship is standing by or at anchor.

D16/R422 288
SNOW, W. B.
Use of AX-50 hydrophone (PN) on ERS buoys. Columbia Univ. - Div. of War Research
July 10, 1943 4p.

This memorandum discusses the proper method of connecting the AX-50 to the radio sonic buoy if, at some future time, its use should be necessary. Until this time, no further circuit analysis should be attempted for quantity production of the AX-50. At a later date, simple changes in the present circuits will adapt the buoys for use with this hydrophone. A frequency curve is provided for reference.

D44/R424 289
Anchored vessel screening, SARDONYX. Columbia Univ. - Div. of War Research
July 11, 1943 4p.

A new system of echo ranging has been developed to overcome previous difficulties. The name "Cobar" indicates that continuous reception is possible and that the range and bearing of a reflecting target can be conveniently determined by use of the system. Cobar is a frequency-modulated system in which the emitted frequency is continually changing at a regular rate and, simultaneously, the frequency to which the receiver is sensitive is changing at the same rate as the change in the emitted frequency.

D20/R425 290
Improved echo-ranging equipment, USS SYLPH. Columbia Univ. - Div. of War Research
July 11, 1943 3p.

The Mark II indicator amplifier control unit is intended to replace the standard QC indicator amplifier control unit as manufactured by Submarine Signal Company and RCA Manufacturing Company. The several units of this rack are specially arranged to be easily accessible for maintenance and are considerably superior to existing equipment. This report is from a transcript of a recorded talk prepared for Seminar Afloat, July 11, 1943.

D16/R426 291
Expendable radio sono buoy, USS YP-252.
Columbia Univ. - Div. of War Research
July 11, 1943 3p.

The expendable radio sono buoy is used in aircraft reconnaissance for enemy submarines. It provides the means for listening from aircraft to underwater sound. The buoy and its associated radio receiver are being produced in quantity under an Army contract for both the Army and Navy. The construction and use of the buoy are discussed in this report, which is a transcript of a recorded talk used in Seminar Afloat, July 11, 1943.

D41/R427 292
Subsight, MARTHA'S VINEYARD, IX97.
Columbia Univ. - Div. of War Research
July 11, 1943 4p.

This report is a transcript of a talk used in Seminar Afloat, July 11, 1943. The talk focused on the mousetrap forward thrower, a new American anti-submarine weapon. The mousetrap uses a rocket-propelled projectile. Subsight's principal function is to indicate the correct time to fire

the mousetrap. Subsight uses a supersonic sound beam directed at the target. This sound beam is frequency modulated, that is, its frequency changes at a constant rate from a lower value to an upper value, then snaps back to the lower value, and repeats this variation periodically.

G12/R428 293
Calibration of underwater sound equipment, BARGE.
Columbia Univ. - Div. of War Research
July 11, 1943 v.p.

The principal function of the equipment on BARGE is the calibration of hydrophones for frequency response and for directional characteristics. The effectiveness of the baffles also can be tested. The equipment and its operation are briefly described. Graphs are included. This report is a transcript of a recorded talk used in Seminar Afloat, July 11, 1943.

G13/R429 294
Artificial underwater sound source (Bostwick projector unit), AMADA.
Columbia Univ. - Div. of War Research
July 11, 1943 3p.

This is a transcript of a recorded talk used in Seminar Afloat, July 11, 1943. AMADA is now equipped as an artificial source of underwater sound, and for this purpose uses a Bostwick Type 1K projector built by Bell Telephone Laboratories. The projector is mounted on the stern of the boat and is trained toward a well in the sound laboratory where hydrophones are lowered into the water for testing. The Bostwick projector has been designed to

radiate sounds in water uniformly over a wide frequency range with moderate conversion efficiency and power capacity. The procedure is described in some detail.

D38/R430 295
Through-the-hull listening equipment, VALOR.
Columbia Univ. - Div. of War Research
July 11, 1943 3p.

The JP-2 through-the-hull sonic listening equipment uses a 3-ft wood-core magnetostrictive hydrophone developed by the New London Laboratory. This hydrophone takes advantage of the minute radial vibrations produced in a thin-walled nickel tube by impinging sound waves. The vibrations generate an alternating voltage in a coil arranged to link with the magnetic flux flowing in the tube wall. This flux changes as the tube wall vibrates. The equipment is described in some detail in this transcript of a talk given during Seminar Afloat, July 14, 1943.

D16/R431 296
HAEFNER, S. J.
Expendable radio sono buoy input transformers.
Columbia Univ. - Div. of War Research
July 14, 1943 3p.

This memorandum was prepared to allow a comparison of frequency-response characteristics of several audio-input transformers, manufactured according to specifications by the Super Electric Company, Jersey City, NJ, with the frequency-response characteristics of the United Transformer Company A-10 input transformer. The transformers may be manufactured,

however, by other companies in accordance with the specifications, which include a transformer designed to work from a 50-ohm hydrophone and a transformer to work from a 2-ohm hydrophone.

D17/R432 297
THURAS, A. L.
Sonic listening.
Columbia Univ. - Div. of War Research
July 13, 1943 2p.

This memorandum describes the way in which a destroyer can be heard passing a submarine while sonic-listening tests are being performed. This information from the submarine would be useful to the destroyer in A/S tests to determine if a successful attack has been made and also might be of value to the submarine in actual combat so that a change in tactics could be employed in the last minutes of attack.

D16/R433 298
MACLAUGHLIN, R. R.
Tests on small hydrophones (for ERSB) submitted by Aircraft Radio Laboratory.
Columbia Univ. - Div. of War Research
July 16, 1943 4p.

Two straight magnetostrictive hydrophones, designed after the manner of the one developed at the New London Laboratory for the expendable radio sono buoy but with all external dimensions reduced, were submitted by the Aircraft Radio Laboratory for test, June 21, 1943. Tests, as covered in detail in the memorandum, indicate that this design is not suitable for the proper functioning of the buoy. On the basis of acoustic calibrations and listening tests, it appears that the reduced-size hydrophone

submitted has a sensitivity distinctly inferior to the present model. It is concluded that smaller hydrophones of the type tested, with reduced sensitivity and poor stability, are unsuitable for use with the expendable radio sono buoy.

G17/G2/R434 299
GONGWER, C. A.

Towed depth-angle sound projector.
Columbia Univ. - Div. of War Research
July 16, 1943 2p.

This memorandum was prepared to summarize the findings of a preliminary investigation of the feasibility of towing a depth-angle sound projector, made at the request of Mr. E. S. Seeley. The reason for towing the projector is to obtain a mounting which is independent of the roll of the ship and, thus, to eliminate the need for a gyroscopically controlled projector. For this purpose, the projector should be towed from the stern of the boat at the center line and at sufficient depth to clear the wake.

D22/D24/D38/R435 300
SNOW, W. b.

Tests of JQ listening systems.
Columbia Univ. - Div. of War Research
Jul. 17, 1943 3p.

This memorandum describes the testing schedule which has been agreed on at various conferences during the past two weeks. The tests are divided into three parts, each of which is described.

D50/P19/R436 301
ROCKWELL, G. O.

Report of progress on the depth-charge indicator.
Columbia Univ. - Div. of War Research
July 19, 1943 3p.

This report details progress made in working on the depth-charge indicator. Preliminary tests were conducted on an amplifier in conjunction with a geophone to determine if directivity could be obtained with the use of a single geophone. Tests showed that the use of a single hydrophone would require the use of a rather elaborate differentiating circuit. Two geophones were used with better results, but the results were not acceptable and the geophones were replaced with two straight wood-core hydrophones. The tests that were conducted with the straight wood-core hydrophones are described and recommendations are made.

G1/R437 302
NOSKER, L. W. and MARKHAM, J. J.

Deep-water echo-ranging conditions near New London.
Columbia Univ. - Div. of War Research
July 19, 1943 3p.

This memorandum is a resume of topics discussed at Woods Hole Oceanographic Institution. Discussed were echo-ranging conditions on the slope of the continental shelf and suggested areas for echo-ranging. The degree of accuracy of the predicted-range charts were analyzed and sensitivity measurements of sound gear diagrammed. It was suggested that a survey of operating areas be completed and Mr. Iselin discussed the waves at the junction of two water layers and salinity conditions.

D16/R438
LEWIS, R. V.

303

ERSB and MAD submarine-search
test.
Columbia Univ. - Div. of War
Research
July 23, 1943 5p.

This memorandum describes ERSB
and MAD submarine-search tests from
Lakehurst NAS, July 13, 1943.
AN/CRT production buoys were not
available, hence the New London
Laboratory furnished reconditioned
Mark IV C units for these tests.
Blimp K-64 left Lakehurst NAS at
0340 and arrived at the rendezvous
at 0746. A MAD search was started,
and a contact was made on USS COD
at 0920. The contact was lost
after a few minutes and about an
hour later a buoy was dropped.
This buoy was too microphonic to
give satisfactory results, but some
hammering sounds were heard. A few
hours later a pattern of four buoys
was dropped, one of which was
useless because of a feed-back
howl. Only water noises were heard
on the other three. Shortly after
1430, the submarine was sighted to
the north of the pattern and a buoy
was dropped near its position. The
audio section of this buoy failed;
therefore, another was dropped. A
MAD contact was made on the
submarine at 1602, and at 1608 loud
submarine sounds were heard on the
last buoy dropped. Operations were
concluded at 1700.

G12/R439
GERJUOY E.

304

Measurements of AX-48
hydrophones, a discussion of the
validity of BARGE calibrating
technique.
Columbia Univ. - Div. of War
Research
July 20, 1943 v.p.

Measurements have been
completed on BARGE on four AX-48
type crystal hydrophones. The
measurements requested on these
units included hydrophone-response
curves to 60 kc and rotational
patterns to 40 kc for the AX-48-1
and the AX-48-6. It proved to be
quite difficult to obtain accurate
data at the higher frequencies and,
as a result, a great many curves
were run on BARGE under differing
measuring situations. It seems
that the present BARGE facilities
are inadequate for measurements in
the 10 to 20 kc range of 3-ft
hydrophones, particularly with
regard to rotational patterns.
Graphs are provided.

D16/R440
MACLAUGHLIN, R. R.

305

The determination of a
heat-treatment cycle for the
partial annealing of drawn-nickel
tubing to secure uniform hydrophone
response.
Columbia Univ. - Div. of War
Research
July 21, 1943 4p.

It was found June 21, 1943,
that the current production of the
D16/R280 Mark IV D 5-in. straight
hydrophone was about 5 dB lower in
sensitivity than the initial
production. A series of tests
revealed that the fault lay in the
nickel shells, and a partial
annealing procedure was developed
through which the batch of nickel
involved could be utilized without
loss in sensitivity. A graph is
included.

D24/R441
GLENNAN, T. K.

306

Telephone conversation with CDR
Rawson Bennett, reference Astatic
contract, July 20, 1943.
Columbia Univ. - Div. of War
Research
July 20, 1943 1p.

This conversation concerned hydrophones and hydrophone cables.

D16/R442 307

SNOW, W. B.

Deep-water sonic ranges.
Columbia Univ. - Div. of War
Research
July 21, 1943 2p.

The tables given should only be used as a basis for consideration of average acoustic or sonic underwater ranges which might be expected under varying conditions. Additional data are being compiled and will be issued subsequently.

A24/R443 308

GLENNAN, T. K.

Coordination of field-
engineering activities in New
London.
Columbia Univ. - Div. of War
Research
July 21, 1943 2p.

General routines that are to be followed in day to day contacts and requests for work to be done are listed.

G20/R445 309

HORTON, J. W.

Visit to National Research
Council, Canada, July 15, 1943.
Columbia Univ. - Div. of War
Research
July 22, 1943 5p.

This report discusses the work that the National Research Council of Canada is doing in connection with subsurface warfare. Their work is concerned with the following subjects: (1) measurements of sound transmission in water at high frequencies, (2) Canadian SLC system, (3) ASDIC test equipment, (4) further BDI developments, (5) determination of

target aspects, (6) quenched water observations, (7) hammer box, (8) echo target, and (9) attack predictors.

G1/R446 310

HORTON, J. W.

Summary of present estimates of
attenuation of sound in water.
Columbia Univ. - Div. of War
Research
July 22, 1943 2p.

Recent work by several groups has resulted in somewhat revised ideas as to the attenuation of sound in water. A general summary of present ideas as to the magnitude of attenuation is given on the attached chart.

G12/G7/R447 311

QUEST, R. G.

Overall calibration of NL-105
#9 amplifier and COG 51053 #30
hydrophone and baffle.
Columbia Univ. - Div. of War
Research
July 21, 1943 v.p.

Tests were conducted to determine the greatest source of noise in the system. Water noise should be the largest noise when the system is in actual use, except in a region about 100-cps wide around 220 cps and at frequencies above 6 kc. At the low-frequency point mentioned, tube noise is limiting while, at the higher frequencies, resistance noise is limiting. Above 10 kc, the hydrophone resistance is appreciably greater (35 dB at 20 kc) than water noise. Graphs are included.

D20/D40/D45/R448 312
GLENNAN, T. K.
Record of telephone
conversation with C. R. Sawyer,
Friday, July 23, 1943.
Columbia Univ. - Div. of War
Research
July 23, 1943 1p.

Mr. Sawyer reported on his
conversation with CDR Rawson
Bennett. They were concerned with
the following topics: (1) Project
D40-thyratron MTB, (2) Project
D40-MTB conversion or step-by-step
gyro installations, (3) Project
D20, and (4) Project D45-WEA-1
investigations.

G12/R450 313
HARRIS, W. T.
Theoretical directivity
characteristics for line
hydrophones.
Columbia Univ. - Div. of War
Research
Aug. 26, 1943 v.p.

Directional characteristics of
plane waves impinging on ideal line
hydrophones previously have been
computed, and are available in
various texts. For greater
convenience in comparing observed
performance with ideal theoretical
characteristics, several
directional characteristics have
been recomputed and are presented
here. These are theoretical
results for very thin line
hydrophones and are not necessarily
accurate for actual hydrophones.
Fourteen curves are included with
the report showing the theoretical
directivity patterns for various
ideal line hydrophones.

D20/R451 314
HULTGREN, H. I.
Chemical-recorder range scale
for use with Mark II echo-ranging
equipment.
Columbia Univ. - Div. of War
Research
July 19, 1943 4p.

The Mark II echo-ranging
equipments sent to Key West and San
Diego were provided with chemical-
recorder range scales but it was
found that they were not entirely
satisfactory. This report
discusses modifications that have
been made in this scale. The new
range scale is being used on the
Mark II rack recently installed on
USS SYLPH and is satisfactory. The
scale can be read during daylight
and twilight hours of operation, as
well as during night hours with the
'blacklite' illumination. Drawings
are included.

D20/R452 315
HULTGREN, H. I.
CRO range scale for use with
Mark II echo-ranging equipment.
Columbia Univ. - Div. of War
Research
July 19, 1943 5p.

CRO range scales were provided
with the Mark II echo-ranging
equipments, but it was found
desirable to introduce
edge-lighting to enable the sound
operator to observe range during
night operations as well as during
daylight and twilight conditions.
The report describes how this
requirement was met. Drawings are
included.

D12E/R453
PROUDFOOT, D. A.

316

Underwater sound survey of New York harbor approaches.
Columbia Univ. - Div. of War Research
Aug. 28, 1943 34p.

The effective use of sonic devices for harbor protection requires a knowledge of the background noise and sound-transmission characteristics of water in the operational area. The present report describes measurements of these characteristics and the related oceanographic properties in the vicinity of New York harbor. The data are useful also in predicting the conditions in less accessible areas. Preliminary conclusions, which are subject to modification in the light of subsequent analyses, are made concerning the background noise and the influence of oceanographic factors on sound transmission.

G30/R454
QUEST, R.

317

The magnitude of tube noise in the sonic and supersonic range.
Columbia Univ. - Div. of War Research
July 27, 1943 21p.

This memorandum was written to furnish additional information on tube noise. The object of present work was to measure the equivalent input-resistance noise of several types of common tubes as a function of frequency through the sonic and supersonic range. The GJ7 and IL4 were selected for this purpose and about eight of each type were measured under various operating conditions. The methods of testings, types of tests, data and conclusions are given.

D22/D24/D38/R455
MANINGER, R. C.

318

JQ listening tests and procedure.
Columbia Univ. - Div. of War Research
July 26, 1943 3p.

This memorandum discusses the procedure for conducting the listening tests and when the tests will be conducted. The tests will be divided into three main groups. The first group will be to compare two amplifiers used with the JK head for sonic listening. The second group of tests will be to compare the JQ with PN crystal hydrophone, JP-1 with supersonic converter, and JK head with either the Brush amplifier or the Electronic Design Group AC amplifier. The final group of tests will compare Brush and through-the-hull equipment for sonic listening.

G12/R456
FOLLIN, J. W.

319

A theoretical investigation of the optimum listening frequency band.
Columbia Univ. - Div. of War Research
Aug. 23, 1943 22p.

It has been found that the ability of the ear to pick boat noise out of background depends on two factors, the number of octaves covered by the listening device and the signal-to-noise ratio. If the signal-to-noise ratio is roughly constant with frequency, it is desirable to have as wide a frequency band as possible, so that the ear can pick out the optimum frequency, which may vary from moment to moment. If the signal-to-noise ratio is best in one frequency band, it is desirable to limit listening to these frequencies because fluctuations do

not alter the frequency band. In general, the ratio assumes nearly a constant value for a range of frequencies and drops off on both sides of the band. The manner in which this investigation was carried out was to compute the transmission loss for ranges and water conditions encountered in practice and to use these loss figures in conjunction with the measured signal-to-noise ratio at close range to determine the signal-to-noise ratio at the limiting range. With the data and a knowledge of the characteristics of the receiving system, including the directivity of the hydrophone and the properties of the ear, it is possible to determine the optimum frequency band for listening.

D16/R458 320
SUTER, H.

Type tests on expendable radio sono buoy first 10 units constructed by Emerson Radio & Phonograph Corp.
Columbia Univ. - Div. of War Research
July 27, 1943 40p.

This memorandum outlines the reasons for developing a redesigned expendable radio sono buoy, and summarizes the results of laboratory and plane drop tests made on 10 such buoy transmitters redesigned by this Laboratory and constructed by the Emerson Radio and Phonograph Corporation. Two AN/CRT-1 transmitters were tested simultaneously to provide an approximate comparison between the two types. The tests made on the transmitters consisted of laboratory measurements of the electrical characteristics, operating-life tests, plane-drop tests, radio-range measurements, and overall acoustic measurements. The overall acoustic measurements

were made using water noise to actuate the submerged hydrophone and recording the resulting audio output from a standard AN/ARR-3 receiver. These tests and the attached data indicated that the redesigned unit, though requiring minor changes, represents a substantial improvement over the present AN/CRT-1 expendable radio sono buoy and immediately can be considered for quantity production.

G21/R459 321
GERJUOY, E.

Measurements of Brush AX-46 crystal hydrophone.
Columbia Univ. - Div. of War Research
Aug. 9, 1943 22p.

Measurements have been completed on BARGE on two Brush AX-46 crystal hydrophones. One of these is constructed with a Rochelle salt crystal and was calibrated by connecting the leads from the hydrophone to the high-impedance input of the BARGE measuring preamplifier. The response curve for this unit is plotted in figure 1. The other hydrophone contains a PN crystal and preamplifier, and is designed to operate into an amplifier furnished with the hydrophone. This unit was therefore calibrated including its amplifier, the output from the amplifier being connected to the high-impedance input of the BARGE measuring preamplifier. The response curve of this hydrophone with its associated amplifier is plotted in figure 10. The curve was obtained with the attenuator on the hydrophone amplifier set at 58. Data were also obtained on the overload characteristics of the Rochelle salt and PN units.

D20/R460
CALLEN, R. J.

322

A sensitivity test unit and description of test procedure for the Mark II D20 rack.
Columbia Univ. - Div. of War Research
Aug. 9, 1943 9p.

The purpose of the sensitivity test unit is to provide a simplified method of testing the operation of the various components of the Mark II D20 rack utilizing a minimum amount of test equipment. The circuit design and general test procedure are described. The methods of testing the BDI amplifier and the audio amplifier are given. Drawings of the equipment are included along with a photograph.

D40/R461

323

Preliminary installation and operation manual for MTB modification of thyatron training control system (Submarine Signal Company).
Columbia Univ. - Div. of War Research
Aug. 2, 1943 22p.

This kit is supplied for the purpose of obtaining, in Model QC echo ranging and echo-ranging listening equipment, a feature which has been designated maintenance of true bearing, or MTB. The kit is applicable only to equipment manufactured by the Submarine Signal Company, Boston, MA, and utilizing thyatron training control. It is necessary that all gear to be converted have a 60-cycle synchro repeater for the purpose of indicating the ships heading to the remote control unit and that this repeater have a one-to-one speed ratio with the master gyro compass. The designation MTB refers to systems wherein the orientation of the projector shaft is automatically

referenced to geographic north rather than to the ship's heading. With the addition of MTB, a change in ships heading does not affect the true bearing of the projector. Numerous photographs of the equipment are included as are blueprints.

D16/D34/R462

324

CARPENTER, T. H.

High-voltage sea batteries for ERSB.
Columbia Univ. - Div. of War Research
July 31, 1943 2p.

The purpose of this memorandum is to record a meeting at the Laboratory on July 24, 1943, attended by Messrs. Jackson Burgess of Burgess Battery Company and A. G. Wambach, H. N. Jasper, G. E. Breeze and T. H. Carpenter of New London Laboratory. The development of sea batteries was covered at this meeting.

D21/R463

325

GERJUOY, E.

Noise produced by burning aircraft flares.
Columbia Univ. - Div. of War Research
July 31, 1943 2p

Measurements have been made of the overall acoustic noise emitted by standard Mark IV and Mark V aircraft float lights. The measurements were made at the quarry to obtain low background noise level, with the overall sound pressures measured simply by reading the output of a Brush AX-58#1 hydrophone on a Ballantine voltmeter. A Ballantine decade amplifier was inserted between the hydrophone and voltmeter to furnish the necessary voltage amplification. A table lists the measurements.

D39/R464 326
CERNY, J. A.

Pneumatic projector for the Mark V float light (for use by heavier-than-air craft).
Columbia Univ. - Div. of War Research
Sept. 3, 1943 8p.

The requirement for a means of dropping float lights vertically initiated development work at the New London Laboratory on a pneumatic projector for use by lighter-than-air craft, as a result of which a suitable unit was designed. Using this equipment as a basis for the design of a projector for use by heavier-than-air craft, a unit was constructed and tested between September, 1942, and July, 1943. Whereas the ground speed at which drops were to be made in the earlier project was a maximum of 75 knots, the present project required operation of the projector at aircraft ground speeds up to 200 knots (230 mph). Static and flight tests of the final equipment show satisfactory operation at aircraft ground speeds up to 185 mph. It is believed that the equipment will operate in a satisfactory manner up to ground speeds of 275 mph.

D21/R465 327
CERNY, J. A.
The smoke-light marker.
Columbia Univ. - Div. of War Research
Aug. 26, 1943 8p.

Past experience with the expendable radio sono buoy has shown the desirability of indicating the position on the water surface of a single buoy or a pattern of them. Although slicks and electric lights have been used in the field and in tests, they are not satisfactory. In designing a suitable marker it was believed

that an aircraft-launched marker with smoke and light characteristics similar to the standard Mark V float light but having a longer burning time would be satisfactory. The present report describes the development of a marker consisting of four Mark V candles arranged to burn in succession. It is ignited on impact with the water surface and burns from 40 to 50 min.

D16/R466 328
GERJUOY, E.; ARCHER, G. W.; and
MACLAUGHLIN, R. R.
Visit to Freed Radio
Corporation for overall acoustic input test of expendable radio sono buoy.
Columbia Univ. - Div. of War Research
July 31, 1943 3p.

The testing tank in use at the Freed Radio Corp. was subjected to testing as reported in the memorandum. The tests were made because differences of as much as 15 dB in hydrophone sensitivity were noted when the leads to the buoy were reversed in hydrophone measurements made at Freed. This difference was not found in tests made at New London on the same hydrophones. The conclusion was that the Freed tank and testing setup was placed in use without adequate preliminary testing to determine how it would function.

D16/R467 329
MACLAUGHLIN, R. R.
Proposed changes in D16 Mark IV E hydrophone.
Columbia Univ. - Div. of War Research
Aug. 3, 1943 2p.

This memorandum describes some changes that are proposed for the D16 Mark IV E hydrophone. One proposed change would be to use some binder and insulator other

than flake shellac between the laminations. Another proposed change would be to cut off the ears on one side of the cores so that the coils could be wound on forms and then slipped over the cores. Also discussed was the problem of loose cores.

D16/R468 330
MACLAUGHLIN, R. R.

Conference on heat treatment of nickel to be supplied to Freed Radio Corp.
Columbia Univ. - Div. of War Research
Aug. 3, 1943 2p.

On July 28, 1943, a conference was held at the Freed Radio Corp. in New York City to discuss the heat treatment needed to obtain the desired magnetostrictive properties in the shipments of nickel soon to be supplied to Freed in New York and Rola in Cleveland for hydrophone manufacture. Arrangements for the heat treatment of nickel were made and test arrangements were agreed on.

D46A/R470 331
PROUDFOOT, D. A. and HOFF, H. B.

Ambient noise survey, Miami area (first four cruises to Bahamas Cay Sal Bank, and east coast of Florida).
Columbia Univ. - Div. of War Research
Aug. 31, 1943 35p.

From June 27 to August 9, 1943, a program of ambient-noise measurements was conducted in the waters adjacent to Florida and the Bahama Islands. Several types of measurements were made during the program and the data are presented here. In making the acoustical measurements, two hydrophones were used: the BTL 5A #14 and the Brush AX-58 #6 with New London preamplifier.

D16/R471 332
BARKSON, J. A.

Conference at Bureau of Ships regarding AN/CRT-1 and AN/ARR-3 equipments.
Columbia Univ. - Div. of War Research
Aug. 6, 1943 5p.

This memorandum covers items discussed at a meeting in Washington, DC. The meeting was called primarily to discuss features to be incorporated in a redesigned receiver to work with the existing nondirectional ERSB and, if practical, with the future directional radio sono buoy. The following items were discussed: size, production plans, preemphasis and deemphasis, magic-eye tuning indicator, receiver input impedance, output impedance, general circuit design, and the New London Laboratory. Other topics were covered at the meeting.

D16/R472 333
GERJUOY, E. and MACLAUGHLIN, R. R.

Calibration data on eight ERSB hydrophones.
Columbia Univ. - Div. of War Research
Aug. 11, 1943 9p.

This memorandum furnishes calibration data on eight D16 Mark IV E hydrophones. Response curves for the eight units, based on BARGE calibrations made immediately after magnetizing, are included in figs. 1 to 8 inclusive.

D16/R473 334
MACLAUGHLIN, R. R.

Test on hydrophones with shells specially heat treated by C. G. Conn, Ltd.
Columbia Univ. - Div. of War Research
Aug. 11, 1943 3p.

Tests were conducted on hydrophones because of the large number being rejected because of loose cores. A description of the tests and the results are given in this memorandum.

P29/R474 335
ARNDT, W. F.

QC driver tuning, comparison of several methods.
Columbia Univ. - Div. of War Research
Aug. 11, 1943 15p.

The question of properly tuning QC drivers to the projectors has arisen several times in the past. A new tuning method has been proposed, namely, to measure the voltage existing across the projector-head terminals as the driver is being tuned. It was thought that a sharp dip in this voltage would occur at the resonant frequency of the projector. Two QC systems were subjected to the tests described in the memorandum. The results of the tests are given.

P18/R475 336
HOOPER, L. J.

Memorandum calibration of pendulum decelerometer.
Worcester Polytech. Institute - Alden Hydraulic Laboratory
July 30, 1943 9p.

This memorandum describes the construction and test of a pendulum-type recording decelerometer suitable for the measurement of accelerations from 5 to 30 g with an accuracy of about 3 g. Further refinement of the recording system design is needed to improve the accuracy.

P20/R476 337
SNOW, W. B.

Visit to Socony Vacuum tanker MOBILGAS.
Columbia Univ. - Div. of War Research
Aug. 10, 1943 2p.

The purpose of the visit to the Socony Vacuum tanker MOBILGAS was to inspect the Electro-Protective Company torpedo detector and to investigate the possibility of making tests on the installation while the ship is still in the yard. The tests to be done can be divided into two parts. One part would be done while the ship is in dock to measure the frequency and gain characteristics of the amplifier channels, both in the loudspeaker and in the relay circuits. This is an entirely electrical measurement. As a second part, an underwater sound generating source will be arranged, either by rigging from the ship or by being carried in a rowboat, so that acoustic characteristics of the sound pickups can be obtained for comparison with a standard hydrophone, which will be suspended in the water just outside the plating carrying the sound pickups. An attempt will also be made at this time to measure the directional characteristics of the pickups, although it is not certain that this will be entirely successful in the cramped quarters and under the noise conditions available at drydock.

D34/R477 338
MACLAUGHLIN, R. R.

Experimental production of the straight toroidally wound hydrophone by Emerson Radio and Phonograph Co.
Columbia Univ. - Div. of War Research
Aug. 12, 1943 2p.

In connection with the experimental production of the straight toroidally wound hydrophone by Emerson Radio and Phonograph Co. for the redesigned ERSB, the writer had several discussions of various items with the manager of the Design Engineering Dept. This memorandum covers the main points of the discussions.

G7/R478 339
HARRIS, W.T.

Calibration of OAY sound measuring equipment #1 and General Radio sound-level meter type 759 Model OR-1, serial number 9. Columbia Univ. - Div. of War Research
Aug. 12, 1943 4p.

The Model OAY sound measuring equipment consists of a Brush AX-58 hydrophone, an amplifier with a calibrated attenuator and output meter, and a 420-ft connecting cable. The amplifier is calibrated so that the reading of the attenuator and output meter is in sound-intensity above 0.0002 dynes/cm². The purpose of this paper is to report a comparison of sound intensity measurements made with this system and the BARGE measuring system using 3A standard hydrophone. The General Radio sound level meter was included in this study to facilitate interpretation of observations made with this instrument.

G1/R479 340
HOFF, H. B. and HARRISON, M.

The evaluation of spectrum-level conversion factors of filters used in background-noise measurements.

Columbia Univ. - Div. of War Research.
Aug. 12, 1943 11p.

In connection with background-noise measurements, it is desirable to convert sound-level readings in a given filter band into average pressure levels per cycle. Due to the departure of commercial filters from ideal flat-topped, infinitely sharp cut-off filters, it is necessary to evaluate the entire band passed by the filter on a power summation basis. The spectrum conversion factors were computed for the ERPI Model 273 industrial noise analyzer, the ERPI Model RA 360 octave band filter unit, and two General Radio Model 760A sound analyzer units.

D16/R480 341
MURPHY, R.

ERSB repairs at Quonset Point, RI
Columbia Univ. - Div. of War Research
Aug. 14, 1943 1p.

This memorandum details repairs made on six units at Quonset Point, RI. The repairs were made by two engineers from the New London Laboratory.

D16/R481 342
KLUMPH, G. B.

Repairs on ERSB shipped from Quonset Point, RI
Columbia Univ. - Div. of War Research
Aug. 14, 1943 1p.

On July 31, eight expendable radio sono buoys (seven AN/CRT-1 and one Mark IV G) were shipped to the New London Laboratory by the Naval Air Station at Quonset Point, RI

R6/R482 343
Catalogue of underwater-sound equipments.
Columbia Univ. - Div. of War Research
July 15, 1943 38p.

This is a catalog of underwater-sound equipment tabulated alphabetically by Navy model numbers. The equipments included are for listening, sounding, and echo-ranging.

G1/R483 344
MARKHAM, J. J. and WHITE D.C.
Comparison of acoustical properties of water in area MIKE and area ROGER.
Columbia Univ. - Div. of War Research
Aug. 24, 1943 2p.

At the request of the Commanding Officer of the U. S. Naval Underwater Sound Laboratory, tests were undertaken to compare the acoustical properties of water in area MIKE and area ROGER adjacent to the eastern tip of Long Island. The results, pertaining to sound-ranging conditions, obtained from data taken in six oceanographic stations in area MIKE and six stations in the northern three-quarters of area ROGER on 16 August 1943 from 0700 to 1619 are summarized in the report.

P28/R485 345
MARKHAM, J.J. and WHITE, D.C.
Oceanographic survey, areas MIKE and ROGER.
Columbia Univ. - Div. of War Research
Aug. 30, 1943 20p.

An oceanographic survey was made of areas MIKE and ROGER off Montauk Point, Long Island. The vessel used in this survey was USS SARDONYX. The survey measurements were made at six stations in each area. The locations of the positions are given in figure 1. Three stations in area MIKE were taken early in the morning and three in the afternoon. The six stations in area ROGER were taken

in consecutive order. At each station, the variation of temperature and salinity with depth was obtained as well as meteorological information and surface conditions. The complete information for each station is given in figures 2 to 13 and in table I. The method of obtaining this information is given in great detail.

D26/R486 346
CALLEN, R. J.
Modification of electrical circuits in the Sangamo range recorder.
Columbia Univ. - Div. of War Research
Aug. 25, 1943 4p.

The purpose of this memorandum is to report certain modifications made in the circuits of a Sangamo range recorder in cooperation with the field engineering group of the New London Laboratory. The manufacturer has recommended that three of the four contacts of the main switch used in the keying circuit of the recorder be removed to increase clearance between the contacts and, thus, decrease high-voltage "creepage." To prolong the usable life of the keying contacts and reduce the transient voltage across these contacts, a circuit of 200 ohms and 0.1 mf connected in series across the keying circuit is also recommended by the manufacturer. Modifications of the range recorder are included in the appendix.

P37/R487 347
Recording Dept.
Catalog of original recordings and training records.
Columbia Univ. - Div. of War Research
N.D. v.p.

This report furnishes additional sheets for the Columbia University Division of War Research Recording Department's record catalog.

G12/R488 348

THURAS, A. L.

Comparison of directive patterns of hydrophones. Columbia Univ. - Div. of War Research
Aug. 28, 1943 2p.

The purpose of this memorandum is to show the superiority of the straight hydrophone compared to a piston hydrophone for obtaining accurate bearings of a sound source. A table of comparisons is included.

D16/R489 349

MASON, R. I.

Notes on experiences as buoy field representative. Columbia Univ. - Div. of War Research
Aug. 28, 1943 3p.

This report covers findings, made by the writer while on duty as a buoy field engineer, which it is believed warrant serious consideration.

D16/R490 350

MASON, R. I.

Training of buoy field representatives. Columbia Univ. - Div. of War Research
Aug. 23, 1943 3p.

This memorandum recommends a definite plan for training buoy field representatives that is based on the writer's experiences and observations in the laboratory and in the field.

G1/R492 351

SEELEY, E. S.

Torpedo attack by sound ranging. Columbia Univ. - Div. of War Research
Sept. 2, 1943 5p.

The purpose of this memorandum is to forward to those interested the results of some preliminary analyses of the problem of torpedo attack on surface vessels from sound bearings only. This memorandum gives equations for the range and angle that are necessary.

G1/R494 352

MANINGER, R. C.

Listening tests of September 14, 1943, on directional versus semi-nondirectional hydrophones. Columbia Univ. - Div. of War Research
Sept. 28, 1943 6p.

On September 14, 1943, tests were conducted on AMADA to determine the difference between listening ranges for a directional and a semi-nondirectional 3-ft hydrophone in a random noise field. The tests were carried out in Chocomount Cove in Fishers Island Sound, where there were no ships close enough to interfere with the tests. The wind state was #2 and the sea state was #2 with a few whitecaps; this gave a substantial amount of random water noise.

D41/R495 353

REED, F. C. and STEPHENSON, R. G.

Mine location with Subsight. Columbia Univ. - Div. of War Research
Aug. 23, 1943 13p.

Early in March 1943, CDR Rawson Bennett, of BuShips, suggested that Subsight gear might be used for purposes of locating mines planted

by enemy craft in channels of harbors. Such mines were presumed to be of the type designed to rest on the bottom. It was suggested that the apparatus be capable of sweeping a fairly broad path down a channel and of locating a bottom mine at a distance of 500 ft or more ahead of the sweeping vessel. Sublight Mark VI was tested in the New London area during the period from July 21 to August 16, 1943, to determine its usefulness in mine-location work. At first tests were made in the New London channel of the Thames River in an attempt to locate three airplane-type mine cases planted there. When it was seen that the data from these tests were inconclusive, the second (and major) phase of the work was undertaken with submerged 33-in. spherical mine cases in Niantic Bay and in Cherry Harbor of Gardiners Bay to study the quality of echoes from mine cases under various bottom conditions.

D16/R496 354
GERJUOY, E. and MACLAUGHLIN, R. R.
Tests on 20 ERSB hydrophones.
Columbia Univ. - Div. of War
Research
Sept. 3, 1943 22p.

This report covers tests on 20 hydrophones sent from the contractor during the weeks ending August 21 and August 28. They will be designated series A and B, respectively, and future series will follow in alphabetical order.

D16/R497 355
MACLAUGHLIN, R. R.
A heat-treatment cycle for partial annealing of drawn-nickel tubing for ERSB hydrophone use.
Columbia Univ. - Div. of War
Research
Sept. 27, 1943 3p.

The response of the ERSB hydrophone is closely associated with the state of anneal of the nickel tubing used in its manufacture. This memorandum outlines a heat treatment for application at the mill to a batch of tubing produced for Freed Radio Corporation by the International Nickel Company.

D26/R498 356
ARNDT, W. F.

Useful data pertaining to Sangamo sound range recorders.
Columbia Univ. - Div. of War
Research
Sept. 2, 1943 4p.

The need has arisen for certain information pertaining to sound range recorders which is not available from the instruction book. Four drawings are included that represent the stylus circuits for the various models of recorders. It should be noted that the impedances, signal voltages, etc., are rather complicated and no simple statements can be made as a complete answer to various questions. The point is that all models of the recorder can readily be converted to perform in the manner of the present recorder, namely model CAN-550 100A.

P20/R501 357
SNOW, W. B.

Merchant-vessel protection conference with Mr. Waterfall.
Columbia Univ. - Div. of War
Research
Sept. 6, 1943 2p.

The purpose of the conference was to discuss the Merchant-Vessel Protection Program and assess its desirability. It was decided that any system employing retractable rotating pickups would require development, which rules them out of consideration as something which

must be ready for procurement by December 1st. The program for the immediate future should probably center on obtaining the best simple indicator system. The only completely available system is the EP gear, which is in production. It is important that its efficiency be thoroughly studied as it may be a satisfactory answer to the problem. However, there seems to be enough question as to whether its sound pickup system and frequency range are optimum so that the possibility of combining another pickup with the EP amplifier and indicator is worthwhile investigating.

D16/R502 358
MURPHY, R.

Buoy launching-tube tests on September 6, 1943.
Columbia Univ. - Div. of War Research
Sept. 10, 1943 2p.

This memorandum reports on a series of buoy drops from a TBF Navy plane with a special buoy-launching tube, mounted in place of the port-side flare tube in the bombardiers compartment. This tube was designed, built, and installed by New London Laboratory personnel. The results are given in this memorandum.

D16/R503 359
MASON, R.I.

Conference on expendable radio sono buoy radar sea-marker problem.
Columbia Univ. - Div. of War Research
Sept. 10, 1943 3p.

A conference was held to bring together representatives of the MIT Radiation Laboratory and the New London ERSB Group. The purpose of the meeting was to see if the experiences and knowledge of the groups could be of benefit in

the solution of two problems: (1) the design of a buoy to be used as a radar sea marker; (2) The use of radar to locate the ERSB.

P36/R504 360
HORTON, J. W.

Echo Doppler indicator.
Columbia Univ. - Div. of War Research
Sept. 10, 1943 5p.

The instrument described in this report has been developed at the J. G. Biddle Co., of Philadelphia, at the request and with the assistance of the New London Laboratory, to provide a visual indication of Doppler shift in echo-ranging. High-frequency reeds are set in vibration electrically by the outgoing ping and by acoustic impulses received from the water due to the ping. This instrument, which has been tested at sea, will give a visual determination of range rate from a single ping with a substantial echo.

D26/R505 361
HORTON, J. W.

Range keeper.
Columbia Univ. - Div. of War Research
Sept. 14, 1943 9p.

A simple form of range keeper has been designed in which a voltage, obtained from a clockwork-driven potentiometer, varies in such a way as constantly to indicate range on a voltmeter calibrated in yards. When correctly set to follow observed ranges, an indication of average range rate is also obtained. The instrument is provided with supplementary potentiometers by which it can be made to give a characteristic indication at the correct instant for firing depth charges or forward-thrown projectiles. The basic principle

involved in this instrument has been found to have advantages, as an aided follower, over more conventional methods.

D16/R506

362

BARKSON, J. A.

Buoy-launching tests from TBF plane, September 9 and 10, 1943. Columbia Univ. - Div. of War Research
Oct. 1, 1943 2p.

This memorandum describes the purpose and results of flight tests of September 9 and 10 in a TBF plane and supplements memorandum D16/R502-358 covering similar tests on September 6, dealing with the installation of a launching tube for ERSB at the request of COMAIRLANT. The purpose of the flight on September 9 was to test a deflector on the outside of the plane. The purpose of the flight on September 10 was to test the buoy launching, modified as the result of the flight of September 6. The conclusion was that the launching tube is generally satisfactory for the intended purpose of launching AN/CRT-1 type buoys at speeds up to 175 knots.

D49/R507

363

ROCKWELL, G. O. and GOURLEY, G. M.

The scatterbomb.
Columbia Univ. - Div. of War Research
Sept. 13, 1943 15p.

The scatterbomb is a cluster of six Mark 10 projectiles surrounding and rigidly bound to a core assembly. This core assembly contains an explosive charge to propel the projectiles outward at the proper instant and a means to shear the binding strap at that instant. The cluster is fired from a K-gun on a Mark 7 depth-charge arbor or on a special arbor designed for this purpose. The

point of dispersion is governed by use of a time-delay detonating squib in the bursting charge. This report covers tests at New London, using various types of arbors, different time delays and weights of bursting charge, and the three standard K-gun impulse charges. These tests have taken place over the period 13 July to 13 September 1943.

D10/R508

364

RIPKEN, J. F.

Velocity characteristics of a 6-in. by 32-in. fast-sinking projectile.
Columbia Univ. - Div. of War Research
Sept. 18, 1943 11p.

This memorandum reports an investigation to determine the gravity descent velocity of a fast-sinking underwater projectile. The projectile tested was 6 in. in diameter and 32 in. long and had a gross air weight of approximately 82 lb. Comparative quantitative velocity data were secured from various combinations of body elements, including two types of fuze housings, two types of nose streamlining, and two types of tail streamlining. The tests were made to confirm the velocity characteristics of specific designs proposed by the New London Laboratory and based on an earlier and more general investigation. The present tests were deemed advisable because of the appreciable increase in predicted terminal velocity over that of earlier designs. From the test data, a family of curves of the time-depth relation for the various body element combinations was formulated. The optimum combination of elements gave a projectile form capable of a terminal descent velocity in water of more than 50 ft per second.

G30/R510 365
HAEFNER, S. J.

A 10-kc wideband supersonic frequency translating system. Columbia Univ. - Div. of War Research
Sept. 17, 1943 29p.

The supersonic listening channel herein described comprises suitable equipment for the transformation of supersonic frequencies to audible frequencies. It makes possible the selection of a listening band 10-kc wide at a desired location in the supersonic and subsonic frequency spectrum ranging from 10 to 100 kc.

D28/R511 366
KITREDGE, C. P.

Release latches actuated by electric squibs. Columbia Univ. - Div. of War Research
Sept. 15, 1943 2p.

The latch described in this memorandum uses a low-powered squib to release a driving spring. The power and length of stroke of the spring may be varied within wide limits. The unit shown in the report provides a force of 65 lb and a travel of 5/8-in. A photograph of the latch is included.

D12C/R512 367
TATUM, A. K. and HERRNFELD, F. P.

Investigation of system noise in cable-connected hydrophone systems, Naval Training School, Fishers Island, NY. Columbia Univ. - Div. of War Research
Sept. 22, 1943 2p.

Listening tests indicated the main source of noise to be a 60-cycle ac hum on the "even number" cable pair. This hum was only 6 to 10 dB below signal

level. Measurements proved there was a high-resistance ground on this pair, which undoubtedly accounts for the hum pickup and for an apparent low signal level noticed on this circuit. It is believed that the pickup comes from an ac cable which it is understood runs parallel to the hydrophone cable for some distance, being only a few feet away near shore. Even if no ac leaks were present, capacity currents from the ac cable could easily account for the pickup in the faulty hydrophone pair.

D16/R513 368
JONES, M. B.
Headphone comparison tests. Columbia Univ. - Div. of War Research
Sept. 20, 1943 4p.

Threshold tests, comparing six headphones (three types), were administered to four subjects (eight ears) to determine the relative efficiency of the headphones. The results of the tests are shown graphically in the accompanying figures. The conclusion was that the Permoflux DHS-12 headphones will be satisfactory substitutes for the other two types in general listening applications.

D34/R515 369
GONGWER, C. A.
Listening and performance tests of gravity turning motor for the Directional Radio Sonic Buoy. Columbia Univ. - Div. of War Research
Sept. 14, 1943 1p.

The object of these tests was to determine the noise made by the turning motor and paddles as they propel the buoy. The gravity motor used was unit No. 3602. It consists of a spool rigidly attached directly below the

hydrophone. Inside the spool is the paddle shaft mounted in preloaded ball bearings. The preloading was to prevent rattling and chuckling of the parts. The paddles were attached to this shaft. A weight of 2 lb 2 oz on a 1-3/8 in. diameter spool gave about 1.3 inch-pounds and a turning speed of 7.8 rpm.

D44/R516

370

ALLEMAN, R. S.

Status report of anchored vessel screening (AVS).
Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

This report outlines the investigations carried out by the New London Laboratory, commencing in January 1943, into the development of a continuously rotated Cobar echo-ranging system, which was only partially completed. The system was designed to be capable of detecting a small submerged target, roughly equivalent to a 3-ft sphere, at ranges in the neighborhood of 250 yd from an anchored ship. The results obtained after eight months of work are as follows: (1) the signal strengths are sufficiently great under good conditions to assure detection at distances up to 300 yd while under poor conditions 150-yd ranges are not assured but may be considered possible; (2) large fluctuations are experienced in the regularity with which good signals are received, (3) it seems possible to produce, by one certain type of Cobar apparatus, a sensitive annulus of about 80-yd width at a mean range of 175-yd and a second annular region of the same width at a mean range of 325-yd; (4) the signals from these regions can be indicated simultaneously on a single cathode-ray oscilloscope on which the traces are 4 circles with radii roughly corresponding to

150, 200, 300, and 350 \pm 25 yd ; (5) the complete control apparatus, including driver, receiver, and indicators, could be housed in a console-type cabinet, roughly 2 x 2 by 3-1/2 ft; and (6) the underwater equipment would consist of 3 crystal transducers of dimensions roughly 4 by 4 by 10 in., which would be rotated by a 1/2-horsepower motor by means of a flexible shaft from a deck mounting to be lowered over the side. The project ended in August 1943, as work on this problem was deemed unimportant.

P20/R517

371

TEAL, E. E.; HAEFNER, S. J.; and GERJUOY, E.

Calibration tests of Electro Protective Corporation's torpedo detector installed on tanker MOBILGAS.
Columbia Univ. - Div. of War Research
Oct. 13, 1943 v.p.

Calibration tests were conducted to determine (1) electrical characteristics, (2) acoustical response with the vessel at rest, (3) water-noise excitation of the system versus speed of the vessel, and (4) range inferred from a combination of the data of (1), (2), and (3). Graphs depict the results of the tests.

A24A/R518

372

ARNDT, W. F.

Proposed test equipments for the field engineering group.
Columbia Univ. - Div. of War Research
Sept. 17, 1943 3p.

This memorandum provides an outline of proposed test equipments in the areas of sound-gear monitor, sound-gear tester, recorder, and fixed target and dockside-projector pattern-measurement equipment.

D51/R519

373

LODA, C. J. and NUNAN, J. K.

Preliminary investigation of a proposed dual listening system (period from August 9 to September 9, 1943).

Columbia Univ. - Div. of War Research

Sept. 13, 1943 15p.

This memorandum reports the results of analyses and other preliminary work in the investigation of a proposed dual listening system. One point that was agreed on was that if a dual listening system was to be practical, the system would have to be used for ranging as well as listening. A graphic analysis of a dual listening system is given. Field observations to date and proposed field tests are included. The application of present techniques to dual listening systems are described and conclusions are reached.

P29/A24A/R520

374

CALLEN, R. J.

Results of field engineering Group V tests of X-2 echo ranging equipment onboard USS MARTHA'S VINEYARD.

Columbia Univ. - Div. of War Research

Sept. 29, 1943 4p.

This memorandum contains the curves that were plotted from data obtained on tests of X-2 echo-ranging equipment. The tests were conducted on September 20, 1943, onboard USS MARTHA'S VINEYARD (IX97), as part of their material training.

P23/R521

375

Installation and operation of the buoy-operator trainer for the expendable radio sono buoy. Columbia Univ. - Div. of War Research

Sept. 18, 1943 28p.

This equipment is intended to serve as a trainer for expendable radio sono buoy operators. The trainer is so designed that actual field conditions are simulated. Recorded submarine and water sounds are transmitted via four "buoy" transmitters to the operator's receiving set in an airplane in such a manner that the operator can receive the submarine signal on one or more of the four frequency bands of his receiver. These bands are blue, red, yellow, or green. Although the ERSB equipment is designed for six frequencies, only four are included in the trainer for comparative listening studies. By "tuning in" on each of four frequency bands, the operator can locate and follow the course of the submarine and experience comparative tuning. The trainer can be used in the classroom for preliminary work and, for advanced training, the recorded sounds can be broadcast directly to the receiver of an airplane.

D34/D16/R523

376

MACLAUGHLIN, R. R.

Conference on heat treatment of nickel for ERSB hydrophone use.

Columbia Univ. - Div. of War Research

Sept. 27, 1943 2p.

This conference was called to discuss the heat treatment required to obtain the desired magnetostrictive properties in a shipment of nickel tubing being drawn for the Freed Radio Corporation and a shipment of nickel strip to be ordered by the Emerson Radio and Phonograph Company.

D34/R525 377
MACLAUGHLIN, R. R.
Visit to Bureau of Ships and
Naval Research Laboratory.
Columbia Univ. - Div. of War
Research
Sept. 23, 1943 4p.

This visit concerned the
toroidally wound hydrophone
utilized in the redesigned model of
the expendable radio sono buoy.
Figure 1 shows a comparison between
the open-circuit voltages of a
toroidally wound and two core-wound
hydrophones with shells made from
the same piece of nickel tubing.

D24/R526 378
SAWYER, C. R.
Submarine noise and performance
of JP-1 sonic listening equipment
aboard USS CORVINA (SS-226)
September 13 and 14, 1943.
Columbia Univ. - Div. of War
Research
Sept. 17, 1943 8p.

This memorandum summarizes
observations made aboard a new
Electric Boat Co. submarine (USS
CORVINA) on September 13 and 14.
JP-1 sonic-listening equipment had
just been installed and it was
desired that instructions in the
use of this equipment be given to
some of the submarine's officers
and men. Because of their
interest, an unusual opportunity
was presented for observing some of
the factors, outside of the
equipment itself, which tends to
limit its usefulness.

G13/A24A/R527 379
HAEFNER, S. J.
Impedance of QC-JK projector
No. 733F168.
Columbia Univ. - Div. of War
Research
Sept. 20, 1943 10p.

Impedance measurements were
taken on the QC-JK projector. The
projector was installed for
operation on USS SEMMES at the time
the measurements were made. A
schematic diagram of the projector
is included. Figure 2 shows the
resistive and reactive impedance
components of the QC section as a
function of frequency. Figure 3
shows the resistive and reactive
impedance. Figures 4, 5, and 6
show, respectively, the loci of
impedances of each QC winding and
of the QC winding connected in
parallel.

D45/D40/R529 380
GRIFFIN, H. H.
Coupling of WEA-1 projector to
WEA echo ranging equipment.
Columbia Univ. - Div. of War
Research
Sept. 20, 1943 3p.

This memorandum summarizes a
survey of USS SC-630's WEA-1
seaboard and WEA electronic sound
equipment. A schematic diagram is
attached that shows the
modifications made when the WEA-1
projector is used with the WEA
rack. The values of condensers #1
and #2 of the existing equipment
are unknown.

G12/R530 381
MACLAUGHLIN, R. R.
Heat treatment of nickel.
Columbia Univ. - Div. of War
Research
Sept. 14, 1943 1p.

Heat treatment of nickel for
hydrophones of the expendable radio
sono buoy is the subject of this
memorandum. This hydrophone is a
straight core-type unit operating
at resonance and must retain its
magnetization under the impact
associated with dropping from an
airplane. Hence, the annealing
cycle chosen must be limited to one
which will not seriously reduce the

coercive force of the nickel. The investigation of hydrophones designed for surface craft or submarine installation, where the requirements as to coercive force may differ, possibly will permit us to obtain the advantages of a slightly greater annealing.

P29/A24A/R531

382

CALLEN, R. J.

Projector patterns of QC-type echo ranging equipment onboard USS SARDONYX.

Columbia Univ. - Div. of War Research

Sept. 28, 1943 5p.

This memorandum describes how a QC monitor was used to obtain horizontal projector patterns of the projector used with the QC-type echo-ranging equipment installed onboard USS SARDONYX, and to show how the shape of the projector pattern is affected by the circuit used to connect the projector to the echo-ranging equipment. Field Engineering Group IV participated in these tests as a part of their material training course.

D46A/R532

383

JOHNSON, M.; MANN, H. J.; and WAGNER, R. A.

Ambient-noise survey, Miami area.

Columbia Univ. - Div. of War Research

Jan. 14, 1944 v.p.

This memorandum presents material supplementary to D46A/R470-331, Ambient-Noise Survey, which describes the results of measurements made on background noise in the waters of the Bahamas and Florida coast. Tentative conclusions are offered, much more detailed oceanographic information is included, types of ambient noises are discussed, deep-water

measurement results have been collected, and all of the measurements made on the last cruise, from Miami to New London, have been included. Also included is the latest information on hydrophone sensitivities and small corrections to be made in all measurements to convert them to absolute levels. Shrimp crackle was generally found over all of the Florida and Bahamas coastal waters, and was encountered in the vicinity of Cape Lookout. It was found in depths as great as 600 ft, and was heard at distances as great as 1000 yd as a "merged" noise.

Croaker noise in the southern waters was found to be negligible except over mud bottoms, but was much louder off the Carolina and Virginia coasts. Crackles were found in water up to 100 ft in depth. Shrimp crackle in general exhibited a rising characteristic from 1 to 30 kc. A peak at 3 kc was sometimes observed. The croaker noise was found to be concentrated below 2 kc.

Intensities of both shrimp crackle and croaker noise were at times sufficient to interfere seriously with supersonic and sonic listening. Some very low ambient-noise levels were found in deep water. Measurements there showed no variation of level with depth. Insufficient data were collected to arrive at any conclusive relationship between noise and sea state.

P21/R533

384

Preliminary installation, adjustment, and maintenance instructions for Model QFL tactical range-recorder teacher.

Columbia Univ. - Div. of War Research

May 8, 1944 v.p.

The Model QFL tactical range recorder teacher is used for instruction on sound range-recorder

operations. It makes possible the classroom reproduction of typical recorder traces and the associated sounds. This manual describes separately the installation, adjustment, and maintenance of the equipment. This arrangement has been followed because it is quite possible that different personnel may be concerned with each phase. Attention is called to the fact that, for proper operation of the equipment, it must be accurately adjusted according to instructions contained in the manual.

D17/R534 385
TEAL, E. E.

A preliminary test of sonic listening equipment and the reduction of generator noise on Thames River net vessel. Columbia Univ. - Div. of War Research
Sept. 30, 1943 5p.

This memorandum details tests made to demonstrate the possibilities of sonic listening on the net vessel at the mouth of the Thames River. The tests determined that lighting generators were putting too much noise in the water by transmission through the hull to permit effective listening; so it was recommended that anti-vibration mountings should be installed on the generator and engine.

G30/R535 386
HAEFNER, S. J.

An impedance bridge for the measurement of balanced or unbalanced to ground circuits. Columbia Univ. - Div. of War Research
Sept. 30, 1943 11p.

This report describes a bridge, similar to the Bell Laboratories 5A impedance bridge, which was constructed by and for the use of

this Laboratory. The instrument is for use in making measurements of the impedance of balanced or unbalanced circuits to ground at frequencies between 1.0 and 150 kc. Impedance is measured in terms of resistance and capacitance in parallel. Impedance can be measured in terms of equivalent parallel resistance up to 111 ohms directly, impedance above this and up to 1 megohm with supplementary computation, and positive or negative equivalent parallel capacitance up to 1.111 mF. This bridge, like the 5A impedance bridge, is designed to be used in conjunction with the W. E. 2A amplifier detector and the W. E. 17B oscillator, or their electrical equivalents.

D16/R536 387
GERJUOY, E. and MACLAUGHLIN, R. R.

Tests on 10 series C ERSB hydrophones. Columbia Univ. - Div. of War Research
Oct. 1, 1943 11p.

Tests have been made on 10 production-model Mark IV E hydrophones for use with the expendable radio sono buoy. The hydrophones were received during the week ending Sept. 4, 1943, and were numbered R3401, R3404, R3405, R3408 to R3410 inclusive, R3412 to R3414 inclusive, and R3416 and are so identified on the included curve sheets. Calibrations were run on the units.

D16/R537 388
GERJUOY, E. and MACLAUGHLIN, R. R.

Tests on 10 ERSB hydrophones (series D). Columbia Univ. - Div. of War Research
Oct. 11, 1943 11p.

Tests have been made on 10 production-model Mark IV E hydrophones for use with the expendable radio sono buoy. The hydrophones were received during the week ending Sept. 26, 1943. Calibrations were run on these units as received and again after remagnetization. The magnetization of all units as received appeared complete. The performance characteristics of each unit after remagnetization are shown on attached curve sheets. The response of all units was satisfactory for the type nickel used and the 1000-cps inductance values of all the units were within prescribed limits. The response curves for this group of hydrophones averaged higher than the curves for the hydrophones of series C.

D24/R539 389
GOYAN, F. M.

Notes on painting JP-1 hydrophones.
Columbia Univ. - Div. of War Research
Oct. 6, 1943 3p.

This investigation has been directed principally toward improving the method of applying a primary coat of vinylite resin (VMCH-Carbon and Carbide Chemical Company) and a finishing coat of lintite ("B" 71 Light Grey, Linings Inc., 914 South Wabash Ave., Chicago). The steps of the process are outlined in the report.

D24/R540 390
WILLIAMS, H. C.

The Model JP-1 sound-receiving equipment.
Columbia Univ. - Div. of War Research
Mar. 16, 1944 23p.

The Model JP-1 sound receiving equipment comprises a 3-ft straight

wood-core magnetostrictive hydrophone, a baffle, a high-gain amplifier operated from the submarine's battery, a power supply filter, headphones, and a loudspeaker. The hydrophone has high directivity and the system is capable of detecting signals at the level of low water noise through most of the audible spectrum. In operation, the equipment provides an excellent monitoring system for own-ship's noise. Its usefulness in detecting the sounds of other ships is limited principally by noise produced by the submarine itself. Some of this noise is transmitted to the hydrophone through the training gear, which is sometimes installed in a location susceptible to noise from some of the submarine equipment. A means of reducing this noise is suggested.

D26/R541 391
GOYAN, F. M.

Control of fogging of chemical-recorder windows.
Columbia Univ. - Div. of War Research
Oct. 6, 1943 2p.

In the past, considerable attention was required to remove the fog that forms on the inner surface of the glass window of chemical recorders. This fog is produced by the condensation of water vapor from the moist paper used in the instrument. Any attempt to keep the glass dry by blowing streams of air over it would tend to dry the paper excessively. For this reason, there seems to be but two possible methods of controlling fog. One method would be to keep the glass warm enough so that moisture would not condense; the other method would involve the use of a wetting agent. The latter method was selected for testing and this memorandum reports on the tests and their results. The conclusion was

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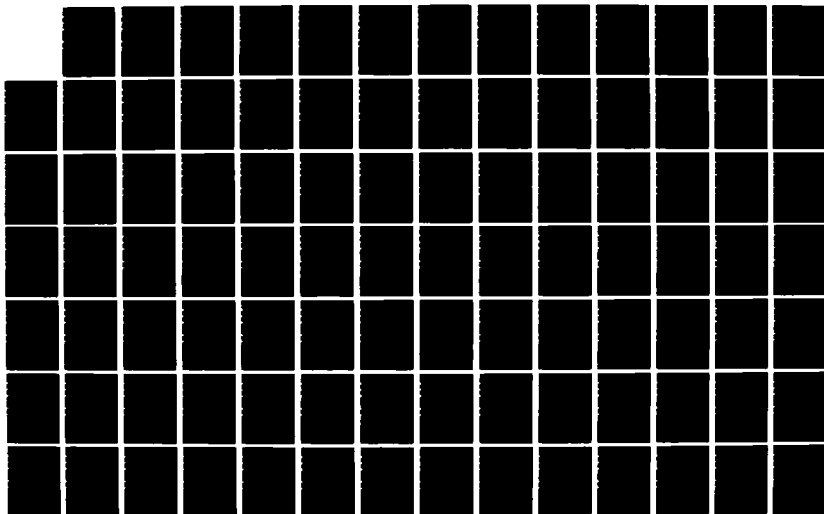
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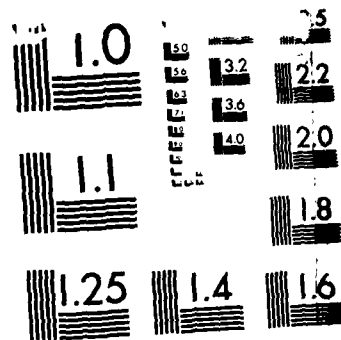
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MICROCOPY RESOLUTION TEST CHART
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that the use of Aerosol O. T. solutions be recommended to prevent fogging of chemical-recorder windows.

D16/R542 392
SUTER, H.

Type tests of 12 model AN/CRT-1 ERSB units received Sept. 8, 1943. Columbia Univ. - Div. of War Research
Oct. 7, 1943 11p.

This memorandum describes type tests that were made on 12 AN/CRT-1 type buoys during September, 1943. The buoys were dropped from a PBY plane near the Southwest Ledge lighthouse, where the results were observed. Subsequently, the buoys were given laboratory tests for hydrophone sensitivity as well as for overall transmitter response.

D17/R543 393
MANINGER, R. C.

Hearing accuracy of 3-, 2-, and 1-ft straight magnetostrictive hydrophones. Columbia Univ. - Div. of War Research
Oct. 9, 1943 5p.

On August 27, September 2, and September 3, 1943, a series of tests were made to determine the bearing accuracy of 3-, 2-, and 1-ft straight magnetostrictive hydrophones. The tests were conducted with AMADA and its artificial sound source at Chocomount Cove in Fishers Island Sound, where the sea and wind were in state 1 during the tests and there were no interfering ships. The equipment used to conduct the tests is described and the results are given. There is an interpretation of the data included.

D51/R544 394
NUNAN, J. K.

Notes on a conference with CDR W. H. Brockman. Columbia Univ. - Div. of War Research
Oct. 26, 1943 4p.

A conference was held to familiarize New London personnel with respect to (1) submarine attack procedure; (2) accuracy of range, bearing, angle on the bow, and speed of target data; and (3) construction details of submarines, as a basis for work on investigation of submarine listening equipment.

G37/A24A/R545 395
ARNDT, W. F.

Sea trial of the barrel-type echo-repeater target (BR-2). Columbia Univ. - Div. of War Research
Oct. 11, 1943 1p.

This memorandum details the sea trial of a barrel-type echo-repeater target. This equipment is now being used at the Coast Guard Academy Sound School.

G37/A24A/R546 396
ARNDT, W. F.

Preliminary sea trial of the towed submerged echo-repeater target (SR-2). Columbia Univ. - Div. of War Research
Oct. 11, 1943 6p.

The preliminary sea trial of the towed submerged echo-repeater target was performed during September 1943 using BILLIE B. Recommendations for use of the target are given.

G12/R547 397
GERJUOY, E. and GOYAN, F.

Measurements of 3-ft straight wood-core hydrophones D546-6 and D546-7.

Columbia Univ. - Div. of War Research
Oct. 15, 1943 3p.

Measurements have been performed on the BARGE on two standard 3-ft straight wood-core hydrophones without baffles. On September 29, 1943, the hydrophones were calibrated as originally assembled here. One was then modified as follows. The shield on the cable was disconnected from the hydrophone case. Each end of the hydrophone was then tightly enclosed in a rubber cap approximately 1/8-in. thick and 2-in. long made by cementing gum rubber with Goodyear rubber cement. Each cap covered the surface of an end of the hydrophone to a distance approximately 2-in. from the end. The caps were wrapped with rubber tape and sealed with Goodyear rubber cement. The hydrophones were recalibrated on Oct. 2, 1943, and the results are described in this memorandum.

D20/R548 398
CALLEN, R. J.

Recent circuit changes in the components of the Mark II Serial 2A echo-ranging rack.

Columbia Univ. - Div. of War Research
Oct. 18, 1943 5p.

This memorandum describes several circuit changes in the D20 Mark II serial 2A rack prior to its installation onboard USS SARDONYX. The Mark II Serial 2 rack is echo-ranging equipment that has undergone several circuit changes. The major changes to the equipment are outlined in the report and drawings are included.

D24/R550 399
WILLIAMS, H. C.

Transmission of noise through JP-1 training gear.
Columbia Univ. - Div. of War Research
Oct. 14, 1943 12p.

Tests have been conducted to determine the extent of interference produced by vibrations transmitted through the structure supporting the hydrophone. This memorandum contains the results of the tests. Some tests indicated that the noise transmitted through the water is, by far, the greater part since the reduction with decks awash is too great to be accounted for by the absence of a water path between the hydrophone and baffle. It must be concluded from later tests that factors which make the data unreliable as a measure of structurally transmitted noise were introduced.

D40/R551 400
SHAFFER, W. G.

Installation of MTB on USS PC 451.
Columbia Univ. - Div. of War Research
Oct. 14, 1943 4 p.

This report discusses various troubles encountered with the installation of maintenance of true-bearing training (MTB) on USS PC-451 at Key West, FL, and corrective measures employed. The results obtained from the initial installation indicate that successful operation necessitates two synchros being mounted on the projector so that the bearing-repeater and training-control circuits can be entirely independent of each other.

D24/R552 401
CHAPMAN, R. Y.
Completion of installation of
JP-1 equipments.
Columbia Univ. - Div. of War
Research
Oct. 18, 1943 2 p.

During the installation of JP-1
equipment, it was discovered that
the voltage-regulator tube had
broken. After the repair was
complete, however, the LCDR was
satisfied with the installation.
Other installations aboard various
ships were also undertaken with few
problems.

D34/R553 402
MASON, R. I.
Tests of directional radio sono
buoys, October 12, 1943.
Columbia Univ. - Div. of War
Research
Oct. 15, 1943 7 p.

This report describes tests
made of prototype directional radio
sonic buoys. Generally, the
results were satisfactory. Photos
of the equipment are included in
this memorandum.

G12/R554 403
GERJUOY, E.
Measurements of AX-58 #6 Brush
crystal hydrophone.
Columbia Univ. - Div. of War
Research
Oct. 19, 1943 5 p.

Figures 1 and 2 attached show
the measured hydrophone response
and open-circuit noise voltage.
Other figures indicate measurements
at various sites, with overall
satisfactory calibration results.

D16/R555 404
GERJUOY, E. and HARRIS, W. T.
Measurements of 5-in.
toroidally wound magnetostrictive
hydrophones, and evaluation of
annealing of nickel.
Columbia Univ. - Div. of War
Research
Oct. 19, 1943 v.p.

Measurements were completed on
BARGE on a number of 5-in.
toroidally wound magnetostrictive
hydrophones. These measurements
were taken to determine the most
suitable nickel (and heat
treatment) for use in the new ERSB
hydrophones. The attached figures
present in detail the comparisons
between the various samples of
nickel.

D16/R557 405
GERJUOY, E.
Measurements of 5-in.
toroidally wound magnetostrictive
hydrophones.
Columbia Univ. - Div. of War
Research
Oct. 20, 1943 v.p.

Three sets of measurements were
performed on four 5-in. toroidally
wound hydrophones covered with
bakelite. All of the measurements
were performed with varying amounts
of air-filled rubber placed inside
the hydrophones, and were performed
on different days. Results
indicated that agreement existed
between measurements made on
different days of identical
hydrophone and rubber
combinations. Frequency curves are
included in this report.

P20/R559 406
PROUDFOOT, D. A.
Preliminary program,
merchant-vessel tests.
Columbia Univ. - Div. of War
Research
Oct. 18, 1943 3p.

As part of the Merchant Vessel Protection Program, measurements were made on a fast merchant ship to (1) evaluate the performance of an existing type of torpedo-detection gear manufactured by the Electro Protective Corp., (2) evaluate the self-noise at and near the hull of such a ship, and (3) obtain information on the relative response to torpedo noise of different types of pickups.

D24/P30/R560 407
SAWYER, C. R.

Submarine-listening systems, report of conference, September 29, 1943.

Columbia, Univ. - Div. of War Research
Oct. 26, 1943 7p.

A conference was held to discuss the development program in submarine-listening systems at sonic and supersonic frequencies. The purpose of this memorandum is to record the main discussion and the decisions reached. The conclusions were that the following should be accomplished: (1) JP-1 operator training, field work, and equipment improvements; (2) development of an interim sonic-supersonic listening system for installation after the supply of present JP-1 equipments is exhausted; and (3) the continuance of the listening-ranging investigation by triangulation.

D40/R561 408
SAWYER, O. E.

MTB conversions - WEA-1 - QCU - training-control systems.
Columbia Univ. - Div. of War Research
Oct. 19, 1943 2.

This memorandum contains a discussion of the relative merits of the thyatron training-control system, as designed by the New

London Laboratory, versus the QCU system, as designed by RCA and now in operation on USS SC-665. The principal criticism of the operation of the QCU training-control system is its lack of smoothness and it is, therefore, suggested that the thyatron be substituted for the QCU.

D40/R562 409
SAWYER, O. E.

MTB conversions, amplidyne-controlled units equipped with step-by-step gyro repeaters.
Columbia Univ. - Div. of War Research
Oct. 18, 1943 2p.

Since the accepted scheme for MTB depends on a synchro repeater system, changes are necessary to the present echo-ranging equipment prior to MTB conversion. A suggested method is to retain the step-by-step motor in the remote control unit to repeat ship's heading and to install an inverter to supply the differential generator only. Sufficient information has already been supplied or is being supplied to BuShips to enable the MTB conversions to be completed easily after the installation of the inverters.

D40/R563 410
SAWYER, O. E.

MTB conversions, Submarine Signal, thyatron training control.
Columbia Univ. - Div. of War Research
Oct. 19, 1943 1p.

This memorandum reports the satisfactory status of the thyatron training-control conversion unit. The Submarine Signal Company will be awarded the contract prior to the installation of the unit onboard USS SEMMES.

D40/R564

411

SAWYER, O. E.

MTB conversions, RCA--
thyatron controlled training.
Columbia Univ. - Div. of War
Research
Oct. 19, 1943 2p.

Recent tests made on USS
SARDONYX indicate that, as long as
reversing relays are used, a
satisfactory conversion to MTB
cannot be made. Any method of
eliminating the relays involves the
use of a new training-control
system, which could be either the
amplidyne system or the Submarine
Signal thyatron system. If the
Navy is in favor of making some of
these conversions, it is suggested
that RCA be requested to provide
amplidyne-controlled training with
MTB, with the New London Laboratory
to act in an advisory capacity.

D17/R565

412

HORTON, J. W.

Proposed investigation of
direct listening for torpedos from
escort vessels.
Columbia Univ. - Div. of War
Research
Oct. 21, 1943 3p.

This report discusses the
various factors involved in
attempting to listen for torpedoes
from a patrol escort vessel
operating at speeds up to 20
knots. It was suggested that a
nondirectional hydrophone be located
within the streamlined dome now
forming part of the echo-ranging
equipment. The proposed tests in
this memorandum are only for the
purpose of obtaining information
showing what might be expected of a
direct-listening system.

D24/R566

413

GRIFFIN, R. H.

Completion of JP-1 installation
on USS ARCHER-FISH.
Columbia Univ. - Div. of War
Research
Oct. 25, 1943 1p.

Sound operators were instructed
in the use of the JP-1 sound-
receiving equipment onboard USS
ARCHER-FISH, where tests were
conducted under submersion.

D24/R567

414

GRIFFIN, R. H.

JP-1 installation board USS
BURR-FISH.
Columbia Univ. - Div. of War
Research
Oct. 25, 1943 2p.

Sound operators were instructed
in the use of the JP-1 sound-
receiving equipment onboard USS
BURR-FISH. Observations were
intended to be made at sea, but due
to unfavorable weather conditions
movements were confined to the
harbor and all tests were made on
the surface. This ship is expected
to be at the U. S. Navy Submarine
Base at a later date so that the
sound operators can be instructed
while submerged.

D24/R568

415

WHITE, D. C.

Listening tests on USS FLASHER,
October 15, 1943.
Columbia Univ. - Div. of War
Research
Nov. 4, 1943 4p.

Listening tests of the JP-1
equipment were made on the USS
FLASHER operating from the U. S.
Navy Submarine Base, New London.
Tests were also made at the Woods
Hole Oceanographic Institution of
the shielding effect of thermal
gradients. A running account of
received signals is attached to
this report.

G30/R569 416
HERRNFELD, F. P. and HAEFNER, S. J.
Amplifier and power supply for
Harvard Laboratory.
Columbia Univ. - Div. of War
Research
Oct. 25, 1943 4p.

Test results of an amplifier
(Dwg. 14662 CE) and power supply
are attached to this report.

G12/R570 417
FOLLIN, J. W.
Effect of submarine roll on
operation of DCI.
Columbia Univ. - Div. of War
Research
Oct. 26, 1943 5p.

This memorandum gives the
results of some calculations made
on the effect of the roll of a
submarine on the operation of the
depth charge indicator (DCI).
Figure 1 (attached) is a scale
drawing of a submarine and gives a
pictorial representation of the
dimensions and angles involved.
Other figures are also attached
that indicate percentage of roll
and depth differences.

D51/R571 418
SAWYER, C. R.
Statement and questions on
factors affecting the design of a
listening-ranging system employing
triangulation.
Columbia Univ. - Div. of War
Research
Oct. 26, 1943 3p.

The fundamental reason for
designing a listening-ranging
system employing triangulation is
to allow the submarine commander
the opportunity to determine the
range and bearing of the target
without revealing his presence
through use of the periscope.
Design proposals are included for
comments.

D16/R572 419
Expendable radio sono buoy,
outline of instructions.
Columbia Univ. - Div. of War
Research
Oct. 26, 1943 7p.

This report is a detailed
outline of instructions to be
implemented by those responsible
for teaching expendable radio sono
buoy techniques.

D24/R573 420
Temporary edition of topside
listening - an operator's manual
for the JP-1 sound receiving
equipment.
Columbia Univ. - Div. of War
Research
Oct. 27, 1943 8p.

This temporary manual gives the
text of an edition now in
preparation. The final copy will
be ready for distribution in the
near future.

G10/R574 421
GONGWER, C. A.
Rocket propeller.
Columbia Univ. - Div. of War
Research
Oct. 29, 1943 3p.

This report describes a rocket
propeller which was built and
tested at the New London
Laboratory. The device (shown in
the accompanying photo) is a
two-bladed air propeller with
motors directed to thrust
tangentially to the circle
described by the blade tips during
rotation. It was felt that
conversion could be doubled by
using a better designed propeller.

D51/R575 422
NUNAN, J. K.
Triangulation listening ranging.
Columbia Univ. - Div. of War
Research
Oct. 26, 1943 4p.

Triangulation ranging by
listening from a submarine has long
been considered impractical because
of the high order of precision
required in obtaining the target's
bearings. Recent developments in
bearing-deviation indication
employing listening gear has made
possible improvements in bearing
determination which make
triangulation ranging by listening
a practical possibility. A
schematic layout is attached for
further explanation.

D38/R576 423
TEAL, E. E. and LARSON, R. O.
Test of dynamotor for JP
equipment.
Columbia Univ. - Div. of War
Research
Oct. 27, 1943 4p.

The dynamotor in the power
supply used with the NL-105
amplifier was connected to the wood-
core magnetostrictive hydrophone on
the through-the-hull gear on CGR
1985. In testing without the
low-frequency filter, the noise of
the dynamotor was intense enough to
be heard over signals and water
noise. A dynamotor designed to
possess similar noise frequencies
and a 20-v and 10-ma increase in
output would make this power supply
more suitable for the requirements
of the amplifier.

G37/A24A/R577 424
ARNDT, W. F.
Preliminary triplane tests.
Columbia Univ. - Div. of War
Research
Oct. 28, 1943 6p.

This memorandum describes a
series of tests conducted for the
purpose of determining whether a
triplane target could be used as a
permanently anchored submerged
target for supersonic echo-ranging
practice and precision-bearing
studies. Results indicated that
additional studies should be made
with similar triplanes, such as 5-
and 4-ft targets. A small
reduction of dimensions from 6 to
5 ft would result in a large saving
in weight, greatly reduced
resistance to motion in water, and
greater ease of handling. Graphs
are attached.

D16/R578 425
GERJUOY, E. and MACLAUGHLIN, R. R.
Tests on 10 ERSB hydrophones
(series E).
Columbia Univ. - Div. of War
Research
Nov. 3, 1943 v.p.

Tests were made on 10
production-model Mark IV E
hydrophones for use with the
expendable radio sono buoy.
Calibrations were run on these
units as received, and again after
remagnetization. Performance
characteristics are shown on the
attached curve sheets.

G12/R579 426
GERJUOY, E.
Measurements of 3A #35 crystal
hydrophone.
Columbia, Univ. - Div. of War
Research
Oct. 30, 1943 3p.

Measurements were made on BARGE
of an acoustic measuring system
consisting of a 3A #35 crystal
hydrophone with the NL-105X
amplifier. Curve sheets are
attached.

D38/R580 427
TEAL, E. E.

Preliminary operational test of amplifier and power supply (CDI 50140, No. 47) of JP sound-receiving equipment. Columbia Univ. - Div. of War Research
Oct. 29, 1943 3p.

A test involving Navy type CDI 50140, Ser. No. 47, amplifier and power supply of the JP sound receiving equipment was made on CGR 1985. This was done to determine qualitatively the noise in the output of the amplifier under certain conditions. All comparisons were made using the flat response of the amplifier.

G12/R581 428
THURAS, A. L.; MANINGER, R. C.; and
BERNIER, H. F.

Sea tests of JP-1 hydrophone. Columbia Univ. - Div. of War Research
Nov. 1, 1943 2p.

Directive patterns of the standard JP-1 hydrophone measured at the Underwater Sound Reference Laboratory (Mountain Lakes) and the New London Laboratory indicate much poorer directive listening than that obtained under actual operating conditions. The primary purpose of the tests, which was to simulate operating conditions, was accomplished, and the data obtained are in agreement with actual directive listening at sea. The accompanying graphs are copies of the data taken on the receiving boat.

P32/R582 429
HORTON, J. W.

Proposed tests on supersonic underwater telephony. Columbia Univ. - Div. of War Research
Oct. 30, 1943 3p.

Regarding the general prosubmarine program, the possibility of underwater communication between submarines by means of voice modulation of a supersonic beam was considered. Suggestions were made to arrange the equipment in such a way as to make comparative tests of the performance of amplitude-modulated and frequency-modulated systems.

G12/R583 430
GERJUOY, E.

Measurements of AX-50 #2 and AX-50 #3 hydrophones. Columbia Univ. - Div. of War Research
Nov. 1, 1943 6p.

Measurements were completed on BARGE of the AX-50 #2 and AX-50 #3 crystal hydrophones. The results of these measurements are specified in the attached curve sheets.

D26/R584 431
Preliminary manual, installation, operation, maintenance of the attack aids adapter. Columbia Univ. - Div. of War Research
Nov. 8, 1943 v.p.

The anti-submarine attack plotter (ASAP) will be used in conjunction with the Sangamo Electric Co. anti-submarine attack teacher (ASAT). At the present time, no means for interconnecting these two devices are available. The New London Laboratory was requested to provide five stop-gap units. This preliminary manual is provided for use with these stop-gap units.

D24/D38/R585 432
HERRNFELD, F. P.

Test requirements for the amplifier (CBD 501-37) of the model JQ underwater sound-receiving equipment.

Columbia Univ. - Div. of War Research
Nov. 1, 1943 10p.

This report contains an outline for testing the electrical characteristics of the amplifier of the JQ underwater sound-receiving equipment. The measuring setup is shown in the attached drawing.

D24/R586 433
SNOW, W. B.

Proposed features of interim amplifier.

Columbia Univ. - Div. of War Research
Oct. 29, 1943 3p.

During discussions of the design of the interim submarine-listening system, it was proposed that the detector and the 6000 - cycle highpass filter be eliminated, since provision of these features conflicts with easy attainment of other desirable design features of the outfit. These include great stability of gain, simplicity of switching, and reduction in the number of vacuum tubes. After careful consideration, however, it was decided that these features should be retained in the interim amplifier unless they produce extreme difficulties in the circuit design.

G30/R587 434
KROENERT, J. T.

Vacuum-tube voltmeter for laboratory use.

Columbia Univ. - Div. of War Research
Nov. 17, 1943 4p.

A vacuum-tube voltmeter capable of reading the true average value of nonsinusoidal waveforms was completed by the Electronic Design Group. The meter was designed to read the true average value of waveforms whose ratio of peak to average is of the order of 20 dB. A drawing and curve sheet are also included in this report.

D24/R588 435
CHAPMAN, R. Y.

Submarine detection, effective temperature gradients on October 16 and 17, 1943.

Columbia Univ. - Div. of War Research
Oct. 20, 1943 4p.

Attached to this memorandum is a log of the listening conditions aboard USS ANGLER conducted during regular operations.

P39/A24A/R589 436
WALTON, C. E. and ARNDT, W. F.

Description of an experimental model of a sound range-recorder trace-projection system.

Columbia Univ. - Div. of War Research
Oct. 28, 1943 v.p.

This report discusses the usefulness of projecting sound range-recording traces on a screen for the purpose of instructing a large number of students. Also included are complete parts lists of the screen and trace projector, listing all drawings and part numbers.

D24/R590 437
SAWYER, C. R.

Requirements for interim topside listening system for submarines (for installation after JP-1 equipments).

Columbia Univ. - Div. of War Research
Nov. 2, 1943 5p.

This memorandum states the requirements to be met by proposed new JP-1 sonic-listening equipment as a basis for the developmental work. Tests are expected to indicate minor changes to be made in the performance specifications and equipment design.

D24/R591 438

Phonograph records for training operators, model JP-1 sound-receiving equipment (records A-1 to A-12, series JP-1).
Columbia Univ. - Div. of War Research
Nov. 3, 1943 4p.

This manual is for instructors and sound operators who use the JP-1 instruction records, A-1 to A-12. These records are intended to help the sound operator identify various types of underwater sounds, as heard by the Model JP-1 sound-receiving equipment. The records show how sonic listening is used to supplement supersonic listening. Examples are given of other ship's sounds, own-subsounds, combinations of these with and without filters, and the technique of sweeping the target. This is a preliminary set of records, soon to be replaced by a more detailed album.

D16/R592 439

BARKSON, J. A.
Conference regarding toroidal hydrophone for AN/CRT-1A unit, November 2, 1943.
Columbia Univ. - Div. of War Research
Nov. 4, 1943 v.p.

Recent tests of 25-mil sheet nickel, welded to form a 5-in. length of 3-in. tubing for the toroidally wound hydrophone proposed for the AN/CRT-1A unit, did not meet expectations based on earlier tests of materials then

available. This memorandum discusses changes in the construction of the hydrophone. Curve sheets are attached for reference.

D51/R593 440

NUNAN, J. K. and ARNDT, W. F.
Proposed specifications for topside listening and echo-ranging equipment for installation of submarines, November 1944.
Columbia Univ. - Div. of War Research
Nov. 3, 1943 8p.

This memorandum discusses two distinct types of listening equipment to be installed aboard new submarines. First, a listening system complete within itself with an overall frequency response from 0.1 to 60 kc, and second, an echo-ranging system capable of pinging at any frequency from 20 to 50 kc, are outlined with conclusions emphasizing the advantages.

D40/D45/R594 441

Preliminary instruction manual for MTB modification of WEA-1 and QCU echo-ranging gear.
Columbia Univ. - Div. of War Research
Nov. 8, 1943 v.p.

Discussed in this memorandum is equipment supplied for the purpose of obtaining in model WEA-1 and QCU echo-ranging equipment a feature which has been designated as maintenance of true bearing, or MTB. This conversion equipment is applicable only to those ships equipped with some means of providing a reference to true north in the form of one-speed synchro signal voltages. Diagrams, photos, and blueprints are also included.

D20/D40/R595 442
Installation and operation
manual for MTB revisions on USS
EAGLE 38 at San Diego, CA.
Columbia Univ. - Div. of War
Research
Nov. 4, 1943 6p.

The changes and additions
described in this manual are
required to provide a standard
arrangement of dials on the bearing
indicator in the Mark II rack, and
also to provide the MTB
(maintenance of true bearing)
feature for the standard
echo-ranging equipment on USS EAGLE
38.

G13/R596 443
GRIFFIN, R. H.
Suggested method of seaboard
unit replacement, obviating marine
railway.
Columbia Univ. - Div. of War
Research
Nov. 6, 1943 6p.

This memorandum discusses the
use of a diver and essential
equipment for seaboard unit repair
work, thus eliminating the
necessity of a marine railway.
Included in this report are
drawings and photos of the
equipment repaired.

G12/R597 444
GERJUOY, E.
Measurements of JP hydrophones.
Columbia Univ. - Div. of War
Research
Nov. 8, 1943 v.p.

This memorandum includes the
results of a number of measurements
of JP hydrophones made at New
London, which, to date, are the
best made. Further improvements in
BARGE measurements must await the
installation of new BARGE training
and hoisting equipment to make

possible efficient use of the
enlarged well space. Numerous
curve sheets are included also.

D24/R598 445
HERRNFELD, F. P.
Test specifications for
CDI-50140 amplifier of Model JP
underwater-sound equipment.
Columbia Univ. - Div. of War
Research
Nov. 6, 1943 8p.

This report contains an outline
for testing the electrical
characteristics of the amplifier of
the Model JP underwater sound
equipment. The measuring setup is
shown in figure 1, attached.
Voltage-gain measurements, noise
measurements, and frequency
responses are detailed.

G13/R599 446
LOYE, D. P. and TATUM, A. K.
Listening studies using QBF and
JK transducers.
Columbia Univ. - Div. of War
Research
Nov. 9, 1943 15p.

Tests were made of QBF and JK
transducers as listening
hydrophones. This memorandum
includes test procedures and
results with accompanying frequency
curves.

G30/R606 447
KROENERT, J. T.
Portable test oscillator.
Columbia Univ. - Div. of War
Research
Nov. 8, 1943 5p.

This memorandum discusses the
"pocket-sized" test oscillator
shown in the attached photos and
drawing. It is designed to cover
the frequency band between 13 and
170 kc in two ranges and to have a
variable output from approximately

1 to 1000 μ V. The oscillator is a two-stage resistance-coupled amplifier employing a Wien bridge in a regenerative feedback network.

P20/R607 448
PROUDFOOT, D. A.

Tests on tanker COLORADO,
November 12 to 20, 1943.
Columbia Univ. - Div. of War
Research
Nov. 8, 1943 5p.

This memorandum outlines a
program of tests to be conducted
aboard the tanker COLORADO.
Included in the testing are (1)
self-noise measurements, (2)
acoustical tests at New London, and
(3) torpedo tests at Newport.

P32/R608 449
SNOW, W. B.

Conference on submarine sound
equipment.
Columbia Univ. - Div. of War
Research
Nov. 8, 1943 20p.

A conference was held at the
New London Laboratory on Nov. 4,
1943, to discuss plans for new
sound equipment on submarines that
will be completed starting in
November of 1944. Included are a
list of attendees and an appendix.

D24/R609 450
GLENNAN, T. K.

Equipment recommendations for
topside listening and echo-ranging
equipment for installation on
November 1944 submarines.
Columbia Univ. - Div. of War
Research
Nov. 9, 1943 15p.

This memorandum is intended to
convey what the CUDWR believes to
be the minimum requirements for
equipment for the upper seaboard

listening and echo-ranging units to
be installed on November 1944
submarines. Included are graphs
and diagrams.

D16/R610 451
HARRIS, W. T.; MACLAUGHLIN,
R. R.; and GERJUOY, E.

Measurements of 5-in. straight
toroidally wound hydrophones,
evaluation of annealing of nickel
II.
Columbia Univ. - Div. of War
Research
Nov. 11, 1943 v.p.

This memorandum reports results
of measurements taken previously in
an attempt to evaluate the
appropriate annealing and other
manufacturing specifications for
the new toroidally wound ERSB
hydrophone. Numerous frequency
curves are included that indicate
the results.

D20/D40/R611 452

Installation and operation
manual for MTB revisions on USS
PC-451 at Key West, FL
Columbia Univ. - Div. of War
Research
Nov. 12, 1943 6p.

The changes and additions
described in this manual are
required to provide a standard
arrangement of dials on the bearing
indicator in the Mark II rack, and
also to provide the MTB
(maintenance of true bearing)
feature for the standard echo-
-ranging equipment of the USS
PC-451. Drawings are included.

D16/R612 453
GERJUOY, E.

Tests on six ERSB hydrophones
(series F).
Columbia Univ. - Div. of War
Research
Nov. 15, 1943 8p.

Tests were made on six production-model Mark IV-E hydrophones for use with the expendable radio sono buoy. The performance characteristics of each unit after remagnetization are shown on the accompanying curve sheets. No loose cores were found and the insulation of all units was satisfactory.

G13/R613 454
TATUM, A. K.

Noise measurements in QBF and JK streamlined domes.
Columbia Univ. - Div. of War Research
Nov. 12, 1943 9p.

This memorandum discusses a series of measurements of the self-noise in the QBF and JK domes on USS SEMMES on October 30 and November 3, 1943. An attempt was made to secure frequency-response and beam-pattern data, but due to difficulties involved in transmitting test frequencies to USS SEMMES from a sending boat, the results from this test were not satisfactory. Photos and frequency curves are included.

D50/R614 455
Installation, operation, and maintenance of the depth charge direction indicator.
Columbia Univ. - Div. of War Research
Dec. 4, 1943 v.p.

The depth-charge direction indicator has been designed as a means of determining the octant of a depth-charge explosion with respect to a submerged submarine and, therefore, as an aid in the planning of escape maneuvers. This manual also contains photos, drawings and diagrams.

D24/R615 456
HERRNFELD, F. P.

Proposed changes in the CDI 50140 amplifier when used as part of interim listening system.
Columbia Univ. - Div. of War Research
Nov. 16, 1943 3p.

This memorandum discusses circuit changes in the CDI 50140 amplifier when used with the interim listening system. Drawings nos. 14630AE and 15718BE are included.

D12/R616 457
SNOW, W. B.; HOFF, H. B.; and MARKHAM, J. J.

Transmission survey, Block Island Sound.
Columbia Univ. - Div. of War Research
Mar. 16, 1944 v.p.

The placement of sonic detection equipment for optimum response requires the knowledge of background-noise levels and the transmission characteristics of the water. The present report describes the methods and results of surveys conducted in Block Island Sound in the vicinity of Fishers Island and Block Island. The survey included both acoustical and oceanographic measurements. The acoustical data consisted of background-noise and transmission-loss measurements. Various conclusions, some of which should be the subject of further study, are presented herein.

P33/R617 458
HORTON, J. W.

Estimation of range by observation of change in signal level.
Columbia Univ. - Div. of War Research
Nov. 18, 1943 5p.

This memorandum suggests that measurements of the level at which the sound from a distant vessel is received can be utilized by submariners for the estimation of range. Also included in this report are graphs explaining the estimates.

D24/R618 459
CHAPMAN, R. Y.
Execution of assignment, Mare Island, CA
Columbia Univ. - Div. of War Research
Nov. 19, 1943 4p.

This memorandum discusses JP-1 training-equipment installations aboard various ships and their operating status.

G12/R619 460
GERJUOY, E.
Measurements of C-35 Brush crystal hydrophones (Navy JO gear).
Columbia Univ. - Div. of War Research
Nov. 20, 1943 6p.

Measurements were performed on BARGE on a pair of Brush C-35 crystal hydrophone assemblies. Frequency curves are attached with the performance characteristics.

G12/R620 461
THURAS, A. L. and BERNIER, H. F.
JP-1 hydrophone vibration measurement.
Columbia Univ. - Div. of War Research
Nov. 23, 1943 3p.

This report discusses a preliminary quantitative measurement of mechanical vibration transmitted to the JP-1 hydrophone assembly, when mounted on its base flange with an absorbing coupling. A diagram and frequency curve accompany this memorandum.

D24/R621 462
HERRNFELD, F. P.

Recheck of NL-102 #10 amplifier removed from USS HOE on November 5, 1943.

Columbia Univ. - Div. of War Research
Nov. 20, 1943 2p.

The NL-102 #10 amplifier was brought to the New London Laboratory for a thorough checkup, after which it was felt that it could be returned to service when the filter switch and knobs are replaced by the new types currently used.

D51/R622 463
ARNDT, W. F.

Triangulation listening ranging.
Columbia Univ. - Div. of War Research
Nov. 23, 1943 3p.

This memorandum discusses the feasibility of automatic target-following devices, actuated by BDI (bearing deviation indicator) circuits. Also included is a layout of a proposed triangulation listening ranging system.

D51/R623 464
Conference notes, echo-ranging and listening equipment for submarines, November, 1944.
Columbia Univ. - Div. of War Research
Nov. 23, 1943 2p.

This memorandum was written in an attempt to reconcile the views of the New London Laboratory and Bell Telephone Laboratories in relation to the operating requirements to be proposed by New London to the Submarine Signal Co. concerning the sound systems to be installed on submarines beginning in November, 1944.

D24/R625 465
HERRNFELD, F. P.

Completion of NL-115 amplifier.
Columbia Univ. - Div. of War
Research
Nov. 27, 1943 v.p.

This report contains specifications for the NL-115 amplifier, which converts supersonic signals in the frequency range from 15 to 60 kc into audio signals. Frequency curves, photos, and drawings are also included.

D24/R626 466

Topside listening, an operator's manual.
Columbia Univ. - Div. of War
Research
Dec. 1, 1943 37p.

This manual explains topside-listening techniques to submarine sound operators. It is written in easy-to-understand language and contains cartoon and caricatures of ship and other underwater sound sources.

D40/R627 467

Preliminary installation, operation, and maintenance instructions for preproduction model of MTB modification kit for thyatron-controlled QC sonar equipment manufactured by Submarine Signal Company.
Columbia Univ. - Div. of War
Research
Nov. 29, 1943 v.p.

This instruction book is furnished for the information of commissioned, warrant, enlisted, and civilian personnel of the Navy, and persons authorized by the Bureau of Ships, whose duties involve design, manufacture, instruction, operation, and installation of radio, radar, or sonar equipment.

D40/R627A 468

Preliminary installation, operation, and maintenance instructions for preproduction model of MTB modification kit for thyatron-controlled QC sonar equipment manufactured by Submarine Signal Company.
Columbia Univ. - Div. of War
Research
Jan. 25, 1944 v.p.

This instruction book is furnished for the information of commissioned, warrant, enlisted, and civilian personnel of the Navy, and persons authorized by the Bureau of Ships, whose duties involve design, manufacture, instruction, operation, and installation of radio, radar, or sonar equipment.

D24/R628 469

BLOMQUIST, E. A
Minutes of Nov. 15 conference on vibration isolation of JP-1 hydrophone.
Columbia Univ. - Div. of War
Research
Nov. 17, 1943 2p.

This report discusses the results of tests and observations on the experimental vibration isolators installed on USS DORADO and ANGLER. It was indicated that some isolation is desirable in all JP-1 installations, although it will probably not provide the same amount of improvement in all submarines.

D24/R629 470
CHAPMAN, R. Y.
JP-1 log and inspection report.
Columbia Univ. - Div. of War
Research
Dec. 1, 1943 5p.

This memorandum contains a log and inspection-report form to be completed by Navy or NDRC personnel as a result of inspection or use of the JP-1 sound receiving equipment. The purpose of the log is for information which may be gained regarding defects in design or the effectiveness of the gear.

D16/R630 471
JONES, M. B.
Headphone comparison tests.
Columbia Univ. - Div. of War
Research
Dec. 9, 1943 3p.

Threshold comparison tests were made of four subjects using Permoflux headphones, Model ANB-H-1A, Units 1 and 2, and Western Electric headphones, Model 711-A, Units 1 and 2. The attached graphs show the threshold curves and sensitivity parameters of the headphones.

G12/R631 472
THURAS, A. L.
Advantages of increased hydrophone length to sonic listening.
Columbia Univ. - Div. of War
Research
Dec. 6, 1943 12p.

This report describes the theoretical directional properties and makes a comparison of the 3-, 4-, and 5-ft line hydrophones for sonic listening. The results indicate the superiority of a longer hydrophone in the quest for improvements to the present sonic equipment. Also included is a handwritten memorandum on the subject by A. L. Thuras.

D34/R632 473
BARKSON, J. A.
Directional radio sono buoy conference and demonstration, project NS-106.
Columbia Univ. - Div. of War
Research
Dec. 4, 1943 v.p.

This memorandum briefly summarizes the results of a conference and demonstration of a working directional radio sono buoy held at the laboratory. Figures, photos, and diagrams are attached to explain its operation in detail.

D24/R633 474
RODGER, M. T.
Standard service method of painting hydrophones and effect on acoustic transparency.
Columbia Univ. - Div. of War
Research
Dec. 7, 1943 5p.

This memorandum discusses the initiation of tests using the standard service method of painting on hydrophones, as used with the JP and JP-1 underwater sound equipment. Certain painting requirements are specified, with subsequent sensitivity tests being performed.

D26/R634 475
HORTON, J. W.
Further discussion of a modified bow scale plate for the sound range recorder.
Columbia Univ. - Div. of War
Research
Dec. 7, 1943 5p.

The purpose of a modified bow scale plate for the sound range recorder is to reduce the error inherent as originally calibrated for targets at considerable depths. A diagram is attached to show values of speed of an attacking vessel and target depth.

The most suitable pivot-point settings are for laying out the bow scale plate proposed by New London Laboratory.

D51/R635 476
ARNDT, W. F.

Conference, Sperry Gyroscope Company, November 23.
Columbia Univ. - Div. of War Research
Dec. 10, 1943 2p.

The object of this conference was to arrive at tentative specifications that could be included in a contract between CUDWR and the Sperry Company on the development of automatic target training.

D51/R636 477
ARNDT, W. F.

Conference, Control Instrument Company, November 29.
Columbia Univ. - Div. of War Research
Dec. 10, 1943 2p.

The purpose of this conference was to present to Control Instrument Co. the problems of designing and manufacturing a servo system, a range calculator, and a range recorder as part of a triangulation-listening-ranging system, and to ascertain whether this company would be interested in accepting a contract for the manufacture of a system to be installed on a submarine assigned to the area.

D51/R637 478
ARNDT, W. F.

Conference, Sperry Gyroscope Company, November 26 and 27.
Columbia Univ. - Div. of War Research
Nov. 30, 1943 3p.

The purpose of this conference was to arrive at an agreement on

the specifications for a servo system and range calculator to be installed on USS S-48 as part of the triangulation-listening-ranging system for submarines. The proposed specifications are attached.

D51/R638 479
ARNDT, W. F.

Conference, Sperry Gyroscope Company, December 1.
Columbia Univ. - Div. of War Research
Dec. 2, 1943 9p.

A further conference was held at Sperry Gyroscope Co. regarding minor differences resulting from specification misunderstandings. Updated specifications are included.

P42/R639 480
LOYE, D. P.

Check of the operations of the Mare Island old and new sound meters.
Columbia Univ. - Div. of War Research
Dec. 9, 1943 10p.

This is a report made on a check of a discrepancy of the order of 5 dB between the old and new sound meters. It was important to determine whether or not the new sound-meter measurements of the new submarines at the Mare Island sound range could be relied on. Included are tables indicating average values of measurements using the model OAY sound measuring equipment.

P35/R640 481
LOYE, D. P.

Electrical calibration of model OAY sound measuring equipment.
Columbia Univ. - Div. of War Research
Dec. 9, 1943 1p.

This report contains instructions for the purpose of

making an independent calibration of the Model OAY sound measuring equipment to check the electrical calibration provided for in the meter itself.

D20/R641 482
WESTNEAT, A. S.
Operation of QC-BDI rack test set.
Columbia Univ. - Div. of War Research
Dec. 10, 1943 2p.

This memorandum describes the operation of the QC-BDI rack test set which is comprised of two units, a vacuum-tube voltmeter amplifier and an oscillator, mounted on one chassis. Output can be obtained at three impedances: 50, 100, and 200 ohms. The switching is so arranged that the same voltage appears across the output regardless of which of the three output impedances is used.

P44/R642 483
SHERWOOD, D. M.; BINGHAM, T. W.; and KREBS, L. E.
Summary of preliminary studies of submarine tactics and equipment.
Columbia Univ. - Div. of War Research
Dec. 20, 1943 2p.

This report discusses the necessity for the Submarine Tactical Systems (STS) Group to study present submarine equipment and tactics to gain a broad knowledge of the overall subject prior to developing recommendations for improvements on future submarines.

G12/R643 484
GERJUOY, E.
Performance of the JP baffle at supersonic frequencies.
Columbia Univ. - Div. of War Research
Dec. 11, 1943 17p.

This memorandum discusses apparent irregularities in acoustic response in the JP hydrophone and baffle assembly. Presented in this report are results of further measurements which have been performed on BARGE in an attempt to secure additional information, with the ultimate object of removing the irregularities. Included are numerous frequency responses.

D49/R644 485
GOURLEY, G. M. and ROCKWELL, R. O.
Scatter Charge for surface vessels.
Columbia Univ. - Div. of War Research
Dec. 13, 1943 17p.

This report discusses the development of a scatterbomb undertaken by CUDWR. Design objectives which were set forth for the development have been substantially met and further work on the project, now referred to as the "Scatter Charge," awaits the results of decisions by BuOrd and COMINCH. Photos and diagrams also accompany this report.

P42/R645 486
LOYE, D. P.
Submarine-noise measurements at Electric Boat Company.
Columbia Univ. - Div. of War Research
Dec. 13, 1943 4p.

This memorandum discusses the suggestion that preliminary tests of the auxiliary noises from new submarines might be made by flooding down the new submarine at the dock to "decks awash" and making measurements with the OAY sound measuring equipment. The hydrophone associated with this measuring instrument could be placed at various distances from the submarine in numerous positions with respect to the bow, beam, stern, etc. Such measurements

could possibly be correlated with the later measurements on the submarine test range with the submarine submerged.

D24/R646 487
NUNAN, J. K.

Modification of existing submarine listening and echo-ranging gear.
Columbia Univ. - Div. of War Research
Dec. 13, 1943 3p.

This memorandum discusses action that might be taken by New London Laboratory for modification of existing submarine listening and echo-ranging gear, with a view toward making listening systems sensitive over a greater frequency range and altering the characteristics of echo-ranging gear so that it might be used without endangering the security of the boat. Also discussed was the consideration of new equipments which may be installed on present submarines.

D24/R647 488
RODGER, M. T.

Operation of the NL-115 supersonic converter (Mark II) as used with the NL-105 sonic-listening amplifier.
Columbia Univ. - Div. of War Research
Dec. 15, 1943 3p.

By the use of the NL-115 supersonic converter and the JP-1 sonic-listening amplifier, it is possible to detect supersonic signals through the output of the JP-1 amplifier. This report describes the operation of the equipment.

D24/R648 489

RODGER, M. T.

Modifications of NL-105 amplifier to accommodate the NL-115 supersonic converter (Mark II).
Columbia Univ. - Div. of War Research
Dec. 15, 1943 4p.

This memorandum provides guidance in the modification of 120-V Operated Model JP-1 (NL-105) amplifiers to accommodate Model NL-115 supersonic converters. Drawings are included.

D21/R649 490
RHEA, D.

Drop tests of Mark VI aircraft float lights, December 7, 1943.
Columbia Univ. - Div. of War Research
Dec. 15, 1943 6p.

This report describes December 7 tests on "Pull Match" ignition of the Mark VI aircraft float light. As a result of these tests, it is believed that this float light is capable of functioning without regard for altitude and speed of aircraft, position of launching, or stability of aircraft. It also has other features which recommend it. Drawings are included.

P42/R650 491
LOYE, D. P. and WAGNER, R. A.

Background-noise measurements, Thames River.
Columbia Univ. - Div. of War Research
Dec. 15, 1943 4p.

The measurements described in this report were made to gather further information concerning the suitability of the waters of the Thames River for noise measurements of submarines. The investigation was confined to the area bounded on

the north by the railroad bridge and on the south by the submarine net. Observations were made in early December.

D42/R651 492
GONGWER, C. A.

Description of the fluid gyroscope.
Columbia Univ. - Div. of War Research
Dec. 22, 1943 4p.

This memorandum discusses a fluid gyroscope, a device that indicates roll angle of a ship or bank of an airplane regardless of the translational accelerations to which it may be subjected at the time. The term "fluid" is applied to either a liquid or a gas. Diagrams of this device are attached to this memorandum.

D24/R652 493
WESTNEAT, A. S.

Electronic modification of JP amplifier to JP-1 equipment.
Columbia Univ. - Div. of War Research
Dec. 14, 1943 7p.

This memorandum reports on operations involved in the electronic modification of the JP amplifier to convert existing through-the-hull amplifier units to topside (JP-1) units. Specifications also accompany the memorandum.

P35/R653 494
HAEFNER, S. J.

A power amplifier and bridge for the measurement of impedance at high power level.
Columbia Univ. - Div. of War Research
Feb. 16, 1943 18p.

This report describes a power amplifier and bridge constructed by, and for the use of, this

laboratory which enable impedance measurements to be carried out at a power level considerably higher than that permitted by the use of the standard impedance bridges and amplifiers previously available in the laboratory. Specifications and frequency curves also accompany the report.

D16/R654 495

Specification for cylindrical magnetostriction hydrophone model D-16 Mark IV E.
Columbia Univ. - Div. of War Research
Dec. 16, 1943 4p.

This specification covers the requirements for a cylindrical hydrophone of the magnetostrictive type equipped with an extension tube on which the attached cable can be coiled. Drawings in report No. D16/R280-159 may be referred to, since it supersedes this account.

P37/R655 496
HANSON, R. D.

Tests on the Dictaphone airborne plastic tape recorder.
Columbia Univ. - Div. of War Research
Dec. 17, 1943 4p.

This memorandum discusses tests made by the New London Laboratory on the Dictaphone airborne plastic tape recorder. The frequency response is shown on the attached curve and details of the recorder's performance are outlined in the report.

P37/R656 497
HANSON, R. D.

Magnetic wire recorders, General Electric Model 20A, Armour Research Model 50.
Columbia Univ. - Div. of War Research
Dec. 17, 1943 10p.

Tests were made by the New London Laboratory on the General Electric Model 20A and the Armour Research Model 50 magnetic wire recorders. Details of each are outlined in this report and comparisons of their characteristics are given. Frequency curves and drawings are attached.

D24/R657 498
WHITE, D. C.

Report of sea tests and performance of model NL-115 supersonic converter, Mark I and Mark II.
Columbia Univ. - Div. of War Research
Dec. 17, 1943 6p.

This memorandum covers the history of the sea tests made on the NL-115 supersonic converter, models Mark I and Mark II, Serial 1, and the observed performance of the NL-115 supersonic converter as used in connection with the JP-1 topside listening system. The comparison of supersonic and sonic operation during the period covered by this report is shown in the attached table. The sonic ranges are found to be consistently greater than supersonic ranges under all conditions encountered during this test period and it is indicated that the NL-115 supersonic converter will perform the necessary functions satisfactorily.

D24/R658 499
RODGER, M. T.

Installation of control box used in conjunction with Armour wire recorder and JP-1 amplifier.
Columbia Univ. - Div. of War Research
Dec. 20, 1943 2p.

This memorandum is provided for guidance in the installation of the control box used in conjunction

with the Armour wire recorder and the JP-1 amplifier. Installation procedures are also provided in this report.

D16/R660 500
SUTER, H.

Type tests of 12 model AN/CRT-1 ERSB units received November 15, 1943.
Columbia Univ. - Div. of War Research
Dec. 22, 1943 3p.

This memorandum describes type tests made on 12 AN/CRT-1 type buoys dropped from a PBM plane in the Thames River near the laboratory. The results of these tests are indicated in the attached table. The first buoy listed in the table was not launched because of a broken antenna. Of the 11 buoys dropped, 2 failed due to manufacturing defects.

P42/R661 501
LOYE, D. P. and WAGNER, R. A.

Noise and vibration measurements of USS GABILAN.
Columbia Univ. - Div. of War Research
Dec. 23, 1943 7p.

Vibration and noise measurements of USS GABILAN were made as an initial step in the investigation of ways and means for more efficiently reducing submarine noise during manufacture. More specifically, the aim of the investigation is to establish whatever correlation is possible between vibration and noise data obtained while the submarine is under construction at the docks of the Electric Boat Company and the noise measurements that are made on the submarine testing ranges in Long Island Sound. The vibration data are being reported by engineers of EB. The auxiliary noises as picked up in the water near the submarine are reported herein. The tests were made under

favorable conditions but despite this fact, the noise measurements show similar trends to those of USS BLUEGILL made on Dec. 17, 1943, by the Navy on the Gardiners Bay sound range.

G13/R662 502
GERJUOY, E. and VAN LENNEP, D. W.
Measurements of C-26 transducer.
Columbia Univ. - Div. of War
Research
Dec. 29, 1943 8p.

Measurements have been completed on BARGE on a C-26 transducer. This transducer consists of four crystal quarter-sections which connect to transformers. The secondary leads from the transformers are brought out externally. The measurements performed originally on BARGE showed unexpectedly poor directivity patterns of half-sections of the C-26. Using the C-10 crystal hydrophone as a receiver and the C-26 as a transducer in air, the field in the immediate neighborhood of the rubber diaphragm of the latter was explored. It was found that the external connections to the transducer did not correspond as supposed to the actual quarter-sections of the C-26. As connected at present, looking at the front or rubber face of the transducer, the four crystal sections and the connections to them are shown in a diagram. The directivity patterns of the transducer were remeasured, using the correct connections, and the behavior was found to be perfectly normal. The results of these measurements, with the connections corresponding to those in the diagram, are shown in the figures that accompany this report.

D24/R663 503
HERRNFELD, F. P. and ARCHER, G. W.
Test specifications for NL-115
supersonic converter.
Columbia Univ. - Div. of War
Research
Dec. 28, 1943 10p.

This report outlines the test procedure that should be followed in determining the electrical characteristics of the NL-115 supersonic converter. The equipment used in working up the test procedure was the General Radio 605-B standard signal generator, Ballantine vacuum-tube voltmeter, Dumont cathode-ray oscillograph, and the General Radio 713-B beat frequency oscillator. The results of the test are included.

G12/R664 504
GERJUOY, E.
Measurements of two JP-1
hydrophones with NL-105 #4
amplifier.
Columbia Univ. - Div. of War
Research
Dec. 27, 1943 15p.

Measurements have been completed on BARGE on two JP-1 hydrophones in standard NL-109 baffles, along with an NL-105 #4 amplifier. These measurements, carried out at the request of D. P. Loye of the New London Laboratory, were designed to carefully check the performance of a measuring system to be installed on a submarine. The two JP-1 hydrophones were identified as USN #6 and D546-5. When measured, each hydrophone was horizontal in a standard NL-109 baffle, one unit being mounted vertically above the other, with a 6-in. separation between hydrophone centers. Calibrations were conducted of the recording system and the open-circuit system. Measurements were made of the frequency response of the entire system, consisting of

the NL-105 #4 amplifier with either hydrophone, and including the bridging circuits. Measurements of the gain of the NL-105 #4 amplifier in the various filter positions were also made for each hydrophone, injecting across 1 ohm in series with the hydrophone and NL-105 #4 input.

D50/R665A 505

Preliminary installation, operation, and maintenance instructions for preproduction model of depth-charge direction indicator.

Columbia Univ. - Div. of War Research
Jan. 25, 1944 v.p.

The depth-charge direction indicator has been designed as a means of determining the direction of a depth-charge explosion with respect to a submerged submarine and, therefore, as an aid in the planning of escape maneuvers. This equipment utilizes the principle of an explosion in an elastic medium creating pressure and wavefronts that radiate in all directions at the same velocity. The first pressure front, or primary wave, is the one which actuates the indicator. Upon arriving at the exterior of the submarine's hull, it impinges on the blastphones, causing voltages to be generated in their coils. These blastphones are arranged in three groups, namely, the ahead-astern group, the port-starboard group, and the above-below group. In operation, the voltage developed in the coil of the first blastphone from each pair to be impinged on is passed on to a triggering device for the associated indicator light. At the same instant these lights are illuminated, the remaining circuits are electrically locked, so that voltages arriving from the remaining blastphones do not register. Thus, three indicator lights will illuminate with each

explosion, and the operator is consequently able to determine whether an explosion has been centered ahead or astern, to port or starboard, and above or below the depth of the submerged submarine.

P20/R666 506
PROUDFOOT, D. A.

Merchant vessel protection, summary of status.
Columbia Univ. - Div. of War Research
Dec. 27, 1943 5p.

The status of the merchant-vessel protection work undertaken by New London Laboratory at the request of Section 6-1 of the NDRC is presented briefly in this memorandum. The measurements have been summarized and the results and conclusions derived from these measurements are given.

P44/R667 507
KROENERT, J. T.

Modification of Model 755 receiver-amplifier.
Columbia Univ. - Div. of War Research
Jan. 8, 1944 1p.

The modification of the tuning range of the Submarine Signal Company Model 755 receiver-amplifier from 14-36 kc to 17.5-53 kc has been completed by the Electronics Design Group and the changes are given in this memorandum.

D50/R668 508
ROCKWELL, G. O.

Depth-charge direction indicator.
Columbia Univ. - Div. of War Research
Oct. 31, 1944 10p.

The depth-charge direction indicator was developed to meet the

need for a device for use in submarines to determine the approximate position, in azimuth and depth, of exploding enemy depth charges. Operation of the depth-charge direction indicator is based on the principle of transmission of pressure fronts through the water, resulting from the release of energy by exploding depth charges. The variations in time of arrival of such a pressure front at different parts of the submarine actuate the circuits of the unit to give a visual indication, by means of lights on the face of the indicator panel, of the approximate direction, with respect to the submarine, in which the explosion has taken place. The device automatically resets itself after the recording of an explosion. Production of this design is now proceeding at the rate of about 40 units each month.

P35/R669 509
HERRNFELD, F. P.
Gain measurements.
Columbia Univ. - Div. of War
Research
Dec. 30, 1943 12p.

This memorandum describes methods for accurately determining the gain of an amplifier or a system of amplifiers in cascade. It is a general treatment and does not apply to any special case. The unit of measurement is described in detail and impedance matching is discussed. The computations of gain are explained.

D14/R670 510
CHAPMAN, R. Y.
Report of visits to Naval
establishments relative to JP-1
field work.
Columbia Univ. - Div. of War
Research
Dec. 31, 1943 3p.

This report covers field work on JP-1 equipment at Naval establishments during the period from December 3 to 23, 1943. Due to various problems and malfunctions of equipment, it is impossible for the Field Engineering Group to carry out the program required by the New London Laboratory for assistance, supervision, and familiarizing of personnel of the Navy with JP-1 equipment.

P35/R671 511
TATUM, A. K.
Automatic frequency-response
recorder.
Columbia Univ. - Div. of War
Research
Dec. 22, 1943 7p.

A number of automatic frequency-response recorders manufactured by Sound Apparatus Company are being used by this laboratory. The recorder plots a continuous curve of decibels in rectangular coordinates. It is desirable to make a number of modifications in this unit to increase its reliability and usefulness. The modifications are discussed in this report. A photo, a graph, and a drawing are included.

D26/R672 512
ARNDT, W. F.
Temporary revival of faded
sound range-recorder traces.
Columbia Univ. - Div. of War
Research
Dec. 28, 1943 1p.

This memorandum discusses a revival method of faded traces of the sound range recorder. The Sangamo Electric Co. advises that a solution of ammonium acetate of pH 10 strength will accomplish this revival for a period of approximately 20 min.

P35/R673 513
ARCHER, G. W.
Use of type 6A8 tube in NL-115
supersonic converter.
Columbia Univ. - Div. of War
Research
Dec. 30, 1943 9p.

This memorandum covers the reasons for the use of a type 6A8 pentagrid converter, a nonapproved tube, in preference to the type 6SA7 approved tube, in the NL-115 supersonic converter. It was decided to use the 6A8 pentagrid converter because of the arrangement of the elements.

D38/R674 514
Specification for baffle
adapter Model NL-112.
Columbia Univ. - Div. of War
Research
Jan. 1, 1944 v.p.

This specification and associated drawings cover the manufacturing information for an adapter for securing a baffle (per specification D38/R203-155) to a 3-in. diameter shaft. This specification is reissued to incorporate changes in the design of the baffle adapter and to call for the drawings reflecting these changes. The adapter consists of a bronze apparatus containing a watertight seal for bringing a 1/2-in. diameter rubber-covered cable through the casting. Drawings are included.

D24/R675 515
WHITE, D. C.
Inspection and tests of JP-1
system aboard the USS BLUEGILL.
Columbia Univ. - Div. of War
Research
Jan. 4, 1944 4p.

At the request of the communications officer of USS BLUEGILL, an inspection was made of the JP-1 equipment. It was

reported that machinery on the boat was causing masking of the signals, rendering the JP-1 system ineffective at times. Some changes were suggested and it is now felt that the JP-1 equipment on USS BLUEGILL can be considered as satisfactory.

D49/R676 516
ROCKWELL, G. O. and GOURLEY, G. M.
The Scatter Charge for surface
vessels.
Columbia Univ. - Div. of War
Research
Feb. 2, 1944 13p.

Work was undertaken to develop a means of projecting a cluster of projectiles from a shipboard-mounted K-gun in a manner such that a bursting charge, firing while the cluster is in the air, disperses the projectiles radially in an essentially circular pattern on the surface of the water. The Scatter Charge developed as a result of this program consists of six Mark X depth charges surrounding and bound to a bursting unit assembly. A standard depth-charge Mark VII arbor, modified to receive the cluster, is employed to fire it from a standard K-gun. Photos and drawings are included with this completion report.

D16/R677 517
Manufacturing and performance
requirements submitted to BuShips
for cylindrical toroidally wound
magnetostrictive hydrophone.
Columbia Univ. - Div. of War
Research
N.D. 6p.

This specification covers the requirements for a cylindrical toroidally wound magnetostrictive hydrophone. Graphs are included.

P35/R679 518
ARCHER, G. W.

Improved preamplifier mounting
for OAY sound-level meter
hydrophone.

Columbia Univ. - Div. of War
Research
Jan. 11, 1944 5p.

This memorandum describes
improvements in the mounting of the
RQ-51055 (AX-55) hydrophone
preamplifier assembly, which is
used with the OAY sound level
meter, and how they may be
incorporated into those units that
have already been put into
service. Drawings are included.

D16/R681 519
WESTNEAT, A. S.

Modification of Freed field-
strength meter.
Columbia Univ. - Div. of War
Research
Jan. 8, 1944 1p.

A set of changes are suggested
for the conversion of the Freed
field-strength meter for use with
the expendable radio sono buoy.

D34/R682 520
ARCHER, G. W.

Tests on ERSB receiver
redesigned for use with DRSB.
Columbia Univ. - Div. of War
Research
Jan. 11, 1944 10p.

The tests covered in this
memorandum were made on a
redesigned frequency-modulation
receiver for use with the AN/CRT-1
and -1A transmitters. The purpose
of the tests was to determine the
comparative performance of the
redesigned receiver with that of
the R-2/ARR-3 and to make
recommendations for design changes
if the unit was found not to meet
the requirements set by the
Laboratory. It is believed that,
with the suggested modifications,

the receiver will be applicable for
use with both the directional and
nondirectional buoys. Graphs are
included.

G12/R683 521
GERJUOY, E.

Measurements of two-section
3-ft. hydrophones.
Columbia Univ. - Div. of War
Research
Jan. 11, 1944 9p.

Measurements have been
performed on BARGE on two 3-ft.
straight wood-core hydrophones and
baffles, each consisting of two
18-in. sections. The results are
shown in this report. Graphs are
included.

D49/R684 522
ROCKWELL, G. O.

The roller loader for the
Scatter Charge and the Mark 6 depth
charge.
Columbia Univ. - Div. of War
Research
Feb. 11, 1944 10p.

The roller loader is a
structure designed to facilitate
the loading of a standard K-gun
with either Scatter Charge or the
Mark 6 depth charge. The original
plan called for either (1)
modification of the roller loader
then in service for loading the
K-gun with the Mark 6 depth charge
so that both types of charge could
be handled, or (2) the design of a
new loader. Dimensional
limitations of existing models
prevented a satisfactory
modification. The new loader
described herein has been designed
and a prototype model built.
Manufacturing drawings have been
prepared. Photos are included.
This is a completion report.

D16/R685 523
BARKSON, J. A. and GLENNAN, T. K.
Representative performance
characteristics of Mark IV-E ERSB
hydrophones.
Columbia Univ. - Div. of War
Research
Aug. 9, 1944 11p.

This is a report of data
collected on Mark IV-E ERSB
hydrophones for comparison
purposes. The response of the
hydrophones that were heat treated
(annealed) is approximately 5 dB
higher than that of the units which
were not heat treated. Graphs are
included.

D16/R686 524
HERRNFELD, F. P.
Ship antenna installation for
expendable sonic buoy range tests.
Columbia Univ. - Div. of War
Research
Jan. 11, 1944 1p.

The Electronic Design Group
recommends that the TBS (ship-to-
shore radio telephone) antenna
which is standard equipment on
destroyers should be used for ERSB
radio-range tests. The group
suggests an optimal method of using
the antenna.

D16/R687 525
WESTNEAT, A. S.
Tone control for ERSB receivers.
Columbia Univ. - Div. of War
Research
Jan. 12, 1944 2p.

A tone control has been
constructed for aural tests to
obtain data pertinent to future
modifications of the AN/ARR-3 and
the new Freed receiver. The unit
consists of two constant-impedance
equalizers, one to attenuate the
high frequencies and the other to
attenuate the lows. A graph is
included.

P20/R688 526
SNOW, W. B. and PROUDFOOT, D. A.
Merchant-vessel protection,
sonic detection of torpedoes from
merchant ships.
Columbia Univ. - Div. of War
Research
N.D. v.p.

This report is concerned with
measurements of torpedo noise and
the self-noise generated by a large
modern tanker, and with an
evaluation of the characteristics
and performance of a sonic torpedo-
detecting device manufactured by
the Electro-Protective
Corporation. Curves are presented
that show the limits of the noise
received from various types of U.
S. and foreign torpedoes at
distances of 1000 and 1500 yd.
Ship self-noise measurements were
made with different types of pickup
units in several locations on a
tanker and indicate the magnitude
of the noise and its variation with
speed and draft of the ship. Data
presented for the
Electro-Protective unit include
determinations of its electrical
and acoustical characteristics and
its response during actual torpedo
firings. Possible improvements to
the Electro-Protective device are
pointed out. Graphs, photos, and
drawings are included.

D16/R689 527
GERJUOY, E.; VAN LENNEP, P. W.; and
MACLAUGHLIN, R. R.
Tests on 15 production ERSB
hydrophones (series G and H) and
evaluation of effect of painting.
Columbia Univ. - Div. of War
Research
Feb. 22, 1944 v.p.

Tests have been made on 15
production-model Mark IV E
hydrophones for use with the ERSB.
Calibrations were run on these
units as received and again after
remagnetization. Many of the
units, as received, were found to

be inadequately magnetized. The acoustic responses of all units were in line with expected values and the 1000-cps inductance values were within the prescribed limits. A study was performed to determine whether or not the hydrophone could be painted without detrimental effects on the acoustic performance. It has been concluded that (1) no impairment has been caused by the painting and (2) no special treatment as regards wetting agent will be required on D16 Mark IV E units so painted. Graphs are included.

D38/R690 528

Specification for the Model NL-110 through-the-hull training gear.
Columbia Univ. - Div. of War Research
Jan. 14, 1944 v.p.

This specification and associated drawings cover the engineering requirements for a manually-trained mechanism to be mounted through the hull of a ship. The specification supersedes specification D38/R271 and is issued to incorporate certain changes in the design of Model NL-110 through-the-hull training gear and to call for the drawings reflecting these changes. The apparatus consists of a 3 in. OD corrosion-resistant plated training shaft which is capable of turning a hydrophone through 720 deg.

G12/R691 529

HARRIS, W. T. and GERJUOY, E.

The complete magnetizing of a 3-ft toroidally wound magnetostriction hydrophone.
Columbia Univ. - Div. of War Research
Jan. 14, 1944 3p.

Measurements have been performed to determine the conditions under which a 3-ft

toroidally wound magnetostrictive hydrophone will be fully magnetized. Full magnetization seems to be attained with a 242-V charger using 160 μ F and no external resistance in series with the hydrophone. The authors believe that the proper way to magnetize a magnetostriction hydrophone is to impose, in a single discharge, a peak current of sufficient strength that the flux in the nickel can reach saturation.

P50/R692 530

Specification for model NL-116 blastphone and mounting.
Columbia Univ. - Div. of War Research
Jan. 17, 1944 v.p.

This specification and associated drawings cover the manufacturing requirements for a 9-in. magnetostrictive blastphone and its mounting. The blastphone consists of a nickel tube 9-in. long and 2-in. in outside diameter, in which is placed a coil of wire wound on a formica core with steel laminations.

D50/R693 531

Specification for Model NL-116 junction box.
Columbia Univ. - Div. of War Research
Jan. 17, 1944 v.p.

This specification covers the manufacturing requirements for a watertight junction box in which cables can be spliced. The junction box provides a watertight chamber into which seven 3/8-in. diameter rubber-covered cables and one 1/2-in. (approximately) rubber-covered cable can be run for splicing. The assembled unit is capable of withstanding, without leakage, the high water pressure to which it is subjected in service. Drawings are included.

D24/R694 532
Specification for conversion of
CDI 50140 to equivalent of CDI
sonic amplifier.
Columbia Univ. - Div. of War
Research
Jan. 18, 1944 v.p.

This specification and the
included drawings contain
instructions for the conversion.

D24/R695 533
Specification for dc power-
supply line filter, type CDI-53136.
Columbia Univ. - Div. of War
Research
Jan. 18, 1944 v.p.

The purpose of the CDI-53136
line filter is to reduce or remove
any extraneous voltages in a dc
power supply that may create noise
or otherwise hinder the performance
of the CDI-50138 amplifier. The
line filter is contained in a metal
box with angle brackets at the base
of each end containing four
mounting holes. Drawings and
photos are included.

D24/R696 534
Specification for adapter
flange for COG 51053 hydrophone and
baffle assembly.
Columbia Univ. - Div. of War
Research
Jan. 19, 1944 v.p.

This specification and
associated drawings cover the
manufacturing information for an
adapter flange for securing the COG
51053 hydrophone and baffle
assembly to a 10-in. diameter
flange. This flange consists of a
flanged bronze casting containing a
watertight seal for bringing a
1/2-in. diameter rubber-covered
cable through the casting. The
flange face of the casting is

machined to form a watertight seal
with a similar flange when backed
to it with suitable packing. Three
supporting members are provided for
holding a baffle.

D24/R697 535
Specification for baffle for
use with COG 51053 hydrophone.
Columbia Univ. - Div. of War
Research
Jan. 17, 1944 v.p.

This specification and
associated drawings cover the
manufacturing requirements for a
baffle for use with COG 51053
hydrophones. This baffle consists
of a streamlined hollow bronze
casting. Flanges are provided in
the casting for securing the baffle
to the adapter flange. The front
of the baffle is designed to
accommodate clamps for securing a
hydrophone to the baffle. The back
side of the baffle is covered with
a neoprene-rubber pad.

D24/R698 536
Specification for metal cabinet
to house a sonic amplifier
equivalent to CDI 50138.
Columbia Univ. - Div. of War
Research
Jan. 18, 1944 v.p.

This specification and
associated drawings cover the
manufacturing requirements for a
metal cabinet to house a sonic-
listening amplifier. This cabinet
is of welded metal fabricated
construction.

D24/R700 537
GRIFFIN, R. H.
JP-1 installation aboard the
USS BANG.
Columbia Univ. - Div. of War
Research
Jan. 31, 1944 2p.

A visit to the Portsmouth Navy Yard was made to inspect the JP-1 installation and to instruct the sound operators aboard USS BANG. During a deep dive, the pull required to maintain rotation of this latest design of JP-1 training gear was measured on the hand wheel at several depths. The sound operators were given some preliminary instructions.

G12/R708 538
HARRIS, W. T.

Performance characteristics of a plastic-covered toroidally wound hydrophone and baffle assembly. Columbia Univ. - Div. of War Research
Jan. 19, 1944 11p.

This memorandum reports the performance characteristics of the hydrophone assembly recently installed on CGR 1985. Graphs and a photo illustrate the discussion.

G12/R709 539
VAN LENNEP, D. W.

Measurements of preamplifier mountings for AX-58 hydrophones. Columbia Univ. - Div. of War Research
Jan. 20, 1944 1p.

An investigation of the effect on noise of different types of preamplifier mountings in AX-58 hydrophones has been made on BARGE. The results of the investigation are reported in this memorandum.

G13/R710 540
GERJUOY, E.

Measurements of C-26-1 #4 crystal transducer. Columbia Univ. - Div. of War Research
Jan. 19, 1944 7p.

Measurements have been completed on BARGE on a C-26-1 #4 transducer. The description of this transducer is essentially the same as that of the C-26 reported in G13/R662, December 29, 1943. Graphs are included.

P39/R711 541
WALTON, C. E.

Recorder-trace projector (RQ 10310 recorder projector assembly). Columbia Univ. - Div. of War Research
Aug. 14, 1944 v.p.

The recorder-trace projector is a set of equipment designed for instructing student groups of limited size in the operation of the sound range recorder. It consists of an enlarged reproduction of the analyzer and control mechanism of the sound range recorder mounted vertically to serve as a screen, in combination with a modified commercial projector mounted over a recorder so that the moving recorder traces can be projected on the screen. This combination of equipment provides an enlarged operating reproduction of the cover plate, range scale, and recording paper of a recorder, on which actual traces can be projected to illustrate typical problems and conditions. Photos are included.

P35/R712 542
HERRNFELD, F. P.

Distortion tests by intermodulation method. Columbia Univ. - Div. of War Research
Mar. 28, 1944 v.p.

This report describes the intermodulation method of distortion tests. By use of this test set, the whole system can be tested dynamically, including electro-mechanical transducers or just an amplifier. This method

gives the overall harmonic distortion of amplifiers with low signal-to-noise ratio. No other single test gives as much information. By its use, the final adjustment of amplifiers for lowest harmonic distortion is comparatively simple.

D53.2/P42/R713 543

LOYE, D. P. and WAGNER, R. A.

Tests at the submarine base on the USS GABILAN (SS-252).
Columbia Univ. - Div. of War Research
Jan. 19, 1944 2p.

Tests were performed to analyze the noises of USS GABILAN prior to correcting them.

D53/R714 544

HERRNFELD, F. P.

Modification of Type OAY sound-measuring equipment.
Columbia Univ. - Div. of War Research
Mar. 30, 1944 3p.

The Electronics Group modified the Type OAY sound-measuring equipment, serial No. 14 by adding a 1000-cycle lowpass filter and a meter-damping circuit. Both circuit changes are shown on the attached drawing.

D56/R715 545

GRAF, V. V. and ALLEMAN, R. S.

Supersonic underwater telephony.
Columbia Univ. - Div. of War Research
Mar. 30, 1944 v.p.

Preliminary tests indicate that supersonic underwater telephony is practical under nearly isothermal conditions at a frequency of 25 kc and using the submarine JK heads as the transmitting and receiving transducers. At this frequency, ranges of 4000 to 5000 yd have been attained with good intelligibility

and at 70 kc ranges of approximately 1500 to 2000 yd have been obtained. With properly designed components, which will be available after April 15, 1944, intelligibility at 27 kc may be anticipated at ranges from 9000 to 10,000 yd. Tests have been limited to the use of frequency modulation. Photos, graphs, and drawings are included.

D45/R716

546

SEELEY, E. S.

Investigation of WEA-1 equipment.
Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

This memorandum describes the work done and the results obtained in the WEA-1 studies over the period May 1 to September 15, 1943. The following seaboard conditions were tested: (1) Type C dome starboard and WEA-2 projector and dome on port side; (2) Bubble-generating structure; (3) headlight projector on starboard equipment; (4) first insulated diaphragm 9 in.; (5) WEA-2 projector and modified dome on starboard shaft; (6) second insulated diaphragm 9 in. in thin dome, starboard, WEA-2 port; (7) baffle removed from WEA-2 (port side) dome; and (8) RCA 14-in. projector in modified WEA-2 dome, starboard, insulated 9 in. in thin dome, port. Drawings, graphs, and photos are included.

G27/R718

547

VAN LENNEP, D. W.

Calibration of a (QB) 733J transducer.
Columbia Univ. - Div. of War Research
Apr. 28, 1944 v.p.

A (QB) 733J transducer has been calibrated on BARGE. The principal purpose of the tests was to

determine the performance outside of the frequency range in which this transducer is normally employed. The following types of measurements were made: (1) response as a receiver, (2) characteristics as a projector, (3) directivity patterns, and (4) impedance patterns. Graphs are included.

D21/R719 548
RHEA, D. O. and SETTERHOLM, V. M.

Smoke signal for practice submarine marker buoy.
Columbia Univ. - Div. of War Research
Mar. 24, 1944 v.p.

The training of surface-craft personnel in submarine warfare requires the use of a marker which is towed on the surface of the water by a submerged submarine to reveal its location. A suitable buoy, equipped with an orange-colored pennant, was designed for this purpose by the New London Laboratory. The need for visibility of the towed marker buoy over a greater range suggested the use of a smoke signal rather than the pennant. This report describes the preliminary development work and tests of the British marker marine, aircraft, T2, and the FS smoke mixtures as smoke-producing agents which could be attached to the submarine marker buoy. The British marker marine is the most satisfactory. Photos are included.

D24/R720 549
GERJUOY, E.

Measurements of supersonic converter EL-510 with NL-105 #6 amplifier.
Columbia Univ. - Div. of War Research
Jan. 24, 1944 10p.

Measurements were made to determine the minimum measurable pressure of the combination when

used with a standard JP-1 hydrophone assembly. The computed curve of minimum measurable pressure is shown in one of the graphs that accompany the report.

D50/R721 550
REYNOLDS, A. T.

Peak-reading vacuum-tube voltmeter.
Columbia Univ. - Div. of War Research
Feb. 2, 1944 2p.

A peak-reading vacuum-tube voltmeter has been designed and a model has been built. By means of a switch, one can select an attack time of 1 or 8 ms and a release time of 1/2 or 4s. A drawing is included.

P42/R722 551
VAN LENNEP, D. W.

Measurement of output versus frequency characteristics of three RCA loud speakers.
Columbia Univ. - Div. of War Research
Jan. 29, 1944 8p.

Measurements of three RCA loudspeakers designed for use on submarines have been completed. The purpose of the measurements was to determine the output versus frequency characteristics of the speakers. The speakers tested were the Type M1-2942, Type M1-2917J, and the Type M1-2944. Graphs are included.

D24/R723 552
CHAPMAN, R. Y.

Visit to Cramp Shipbuilding Company and Philadelphia Navy Yard.
Columbia Univ. - Div. of War Research
Feb. 2, 1944 1p.

The training equipment aboard one of the submarines under construction at the Cramp

Shipbuilding Company was inspected. About 6 deg of play was found in the gear box. This problem was corrected. The writer also visited the RMO of the Philadelphia Navy Yard regarding the French submarines there.

P45/R724 553
KROENERT, J. T.

Completion of wideband converter.
Columbia Univ. - Div. of War Research
Jan. 25, 1944 3p.

The Electronic Design Group recently completed an experimental wideband converter for the extension of the tuning range of the Model 755 Submarine Signal Company receiver-amplifier. The converter was designed as a simple single conversion unit which could be used to provide reception at approximately 64 kc with a 755 receiver. A double conversion system will be resorted to if tests indicate that the present one is unsatisfactory. A graph is included.

D49/R725 554
ROCKWELL, G. O.

Test of Scatter Charge bursting units at the Naval Proving Grounds, Dahlgren, VA.
Columbia Univ. - Div. of War Research
Jan. 31, 1944 1p.

On January 21, 1944, eight Scatter Charge bursting units were tested at the Naval Proving Grounds at Dahlgren, VA.

D24/D38/R726 555
TEAL, E. E.

Elimination of electrical noise in sonic-listening equipment.
Columbia Univ. - Div. of War Research
Jan. 31, 1944 4p.

In the development of sonic-listening systems for small patrol craft, early tests were conducted aboard a wooden-hulled boat. On occasions, various electrically operated auxiliaries and radio transceivers interfered with listening. In trying to eliminate this difficulty in the sound gear, tests were made that indicated the noise was entering the listening system through either the original toroidal hydrophone or the straight wood-core hydrophone. As a result of further testing, it was decided to substitute the straight toroidally wound hydrophone for the wood-core type because the straight toroidally wound hydrophone was very close to the final stage of development.

D24/G12/R727 556
GERJUOY, E.

The complete magnetization of the JP-1 hydrophone.
Columbia Univ. - Div. of War Research
Jan. 31, 1944 2p.

Measurements were conducted to determine the conditions under which a JP-1 hydrophone will be fully magnetized. As a result of these tests, it was found that full magnetization is very nearly attained with a 280-V charge, using 240 μ F and no external resistance in series with the hydrophone.

D24/D51/R728 557
SAWYER, G. R.

Report of conferences on pro-submarine matters in Washington, DC on January 4, 1944.
Columbia Univ. - Div. of War Research
Jan. 21, 1944 6p.

This memorandum reports the results of conferences on prosubmarine subjects. The following subjects were reviewed as to recent progress, present status,

and future plans: (1) JP to JP-1 conversion, (2) NL-115 supersonic converter, (3) vibration and shock isolation mountings for electronic equipment, (4) November 1944 sound equipment for submarines, (5) listening-ranging system, Project D51, and (6) Underwater telephony.

D24/R729 558
WHITE, D. C.

Summary of JP-1 topside sonic-listening system for submarines performance, operation, installation, and troubles.
Columbia Univ. - Div. of War Research
Jan. 28, 1944 8p.

This memorandum deals with performance, operation, and observations made in connection with field tests of the JP-1 topside listening system on new construction and S-type submarines. Ranges over which signals can be received vary greatly with water conditions and no specific values of limiting ranges can be given. However, the average consistent range is about 5000 yd. Installation, problems, and suggestions are also discussed.

D50/R730 559
ROCKWELL, G. O.

Water-tight cable entrance fitting for underwater service.
Columbia Univ. - Div. of War Research
Feb. 24, 1944 v.p.

The use of electrical underwater equipment has made necessary the development of a special pressure gland or fitting to provide a watertight entrance for the rubber-covered cables used to interconnect such equipment. This fitting was developed primarily as an accessory to the depth charge direction indicator, and is incorporated as part of the junction box through which the

rubber-covered cables from the hydrophones are carried into the interior of the submarine. Such a fitting will, however, have general application to underwater installations of electrical equipment wherever water-tight cable entrances are required.

G10/R731 560
SNOW, W. B.

Use of short echo-ranging pulses for secrecy.
Columbia Univ. - Div. of War Research
Jan. 27, 1944 2p.

This report concludes that increased power and short pulses will not necessarily increase the secrecy of submarine echo-ranging from the long-term point of view, although it is very likely that they will for some time after their introduction.

D24/R732 561
SNOW, W. B.

The JP-1 hydrophone - baffle assembly.
Columbia Univ. - Div. of War Research
Feb. 8, 1944 6p.

This report analyzes the good and bad points of the JP-1 hydrophone and baffle assembly and presents suggestions for future developments. The hydrophone operates in three frequency ranges: very low sonic; sonic, which extends from 1500 to 10,000 cycles; and supersonic. There is sharp directivity only in the sonic and supersonic ranges.

G12/R733 562
GLENNAN, T. K.

Division of responsibilities for hydrophone design and development.
Columbia Univ. - Div. of War Research
Feb. 2, 1944 2p.

Memorandum for file (G12/R732) formed the basis of this meeting on magnetostrictive hydrophone design and development. A new hydrophone-baffle design was discussed. Although most war-patrol reports on the JP-1 system have been complimentary, present interest in the equipment and current developments in the D-51 project dealing with triangulation listening and ranging gear indicate that the tactical and evasive capabilities can be improved. The hydrophone-baffle development is an important part in this undertaking.

D16/R734 563
GERJUOY, E.; VAN LENNEP, D. W.; and
MACLAUGHLIN, R. R.

Tests on 18 production ERSB hydrophones (series 1) of Emerson manufacture.
Columbia Univ. - Div. of War Research
Feb. 9, 1944 v.p.

Tests have been made on 18 production-model toroidally wound ERSB hydrophones. The tests were made after the buoys had been drop tested. Acoustic calibrations of the units are in general agreement with design expectations. The measured values of insulation resistance to sea water appear satisfactory for the operation of the hydrophones.

D24/R736 564
WHITE, D. C.

Dockside inspection of JP-1 installations on USS BLUEGILL, PERCH, and BREAM.
Columbia Univ. - Div. of War Research
Feb. 9, 1944 4p.

This report deals with dockside inspections of JP-1 equipment on three new-construction submarines and with various conditions that have been encountered.

D34/R738 565
GERJUOY, E.

Measurements of baffles for the directional-buoy hydrophone.
Columbia Univ. - Div. of War Research
Feb. 9, 1944 v.p.

Various designs of baffles were tested to determine their effect on the directional pattern and front-to-back discrimination of a DRSB straight toroidally wound hydrophone. No final conclusion has been reached as to what constitutes the most satisfactory baffle. Further investigation is planned. Graphs are included.

P28/R739 566
MARKHAM, J. J.

Oceanographic data taken during the underwater-telephony tests.
Columbia Univ. - Div. of War Research
Mar. 15, 1944 v.p.

Oceanographic data were taken during Laboratory underwater supersonic-telephony tests. The tests were made under typical winter conditions found around New London. Graphs are included.

D10/R740 567
KITTREDGE, C. P.

Tests of Mark 12 depth charges mine tank, NOL, Washington, DC
Columbia Univ. - Div. of War Research
Apr. 4, 1944 v.p.

The tests of Mark 12 depth charges described in this memorandum were performed at the NOL mine tank, Washington, DC during February and March, 1944, by personnel of the tank staff and representatives of New London Laboratory. The track was mounted on a bridge at the top of the tank. The water surface was maintained at 8 ft below the

bridge, giving a water depth of about 52 ft above the gravel bottom of the tank. It should be noted that this does not represent service conditions, in which both track and charges would partake of the forward motion of the ship. The tests were made to determine the effect on dispersion of certain variations in the nose and tail structure. Tables give the results of the tests.

G20/R741 568
SNOW, W. B.

Conference of February 3, 1944, on echo-ranging type fuzes. Columbia Univ. - Div. of War Research
Feb. 10, 1944 3p.

The fuze under discussion at the conference is designed to operate in the Mark 9 depth charge at a 25 ft/s sinking rate. By means of a transducer of appropriate beam pattern, a 25-kc tone is continuously radiated. The same transducer picks up the returned echo, which has a different frequency because of the Doppler effect as the depth charge approaches the submarine. This returning frequency is heterodyned by the outgoing frequency and, when the difference tone is approximately 40 cycles, the fuze is fired. The firing position depends on the rate of change of frequency and the actual intensity of the returned echo. The probable maximum lethal range is about 20 ft and, by adjustment of the sensitivity, the maximum operating range can be set between 25 and 60 ft. The object of the tests on reflectivity which were proposed was to determine a proper sensitivity setting.

G12/R742 569
FOLLIN, J. W.

Elimination of any currents in magnetostriction hydrophones. Columbia Univ. - Div. of War Research
Feb. 24, 1944 6p.

This memorandum discusses the lamination of the magnetostriction hydrophones to eliminate eddy currents. Lamination accomplishes two purposes. First, it increases efficiency and second, it decreases the variation of inductance and resistance with frequency. The increase in efficiency is important only at supersonic frequencies because the present sonic-listening gear is not limited by circuit noise in the sonic range. This increase of efficiency is needed only if it is found desirable to listen to ship noise at supersonic frequencies, because the present listening gear has adequate efficiency to detect echo ranging. There is an advantage, however, in having constant inductance because it may be used more readily in a delay network or other system where it must be matched to an electrical network.

G12/R743 570
FOLLIN, J. W.

Delay network to obtain front-to-back discrimination. Columbia Univ. - Div. of War Research
Feb. 11, 1944 v.p.

It is possible, by the use of two hydrophones and a delay network, to obtain front-to-back discrimination with line hydrophones. This method has several advantages compared with the use of a baffle: (1) it is possible to listen in a backward direction by throwing a switch, instead of having to rotate the sound gear 180 deg; (2) better discrimination can be obtained; and

(3) the low-frequency response of the hydrophone is not diminished. It has the disadvantage of requiring two balanced hydrophones with small eddy currents. There are two different ways to connect the two hydrophones and delay network to obtain such discrimination. The hydrophones are separated by a quarter wavelength at the midband frequency (in this case, 5 kc) and the delay network is adjusted to give the same delay as that through the water.

P21/R744 571
SNOW, W. B.
PRT and QFL, Method of operation and sample traces. Columbia Univ. - Div. of War Research
Feb. 21, 1944 6p.

This memorandum describes the features of the electrical system of the QFL equipment, as agreed upon at a conference of Messrs. Neff, Herrnfeld, and Snow. A sketch is included that illustrates the various traces obtainable on the equipment. The adjustments of the apparatus to secure these traces are also described.

G12/R746 572
HARRIS, W. T.
Special hydrophones for range and bearing studies. Columbia Univ. - Div. of War Research
Feb. 15, 1944 7p.

This report describes the characteristics of a group of four 9-in. and two 2-ft hydrophones specially constructed for use in an assembly for curvature ranging and BDI studies.

D34/R747 573
BARKSON, J. A.
Directional radio sono buoy conference and demonstration ASDEVLANT, Quonset NAS, March 22, 1944.
Columbia Univ. - Div. of War Research
Mar. 29, 1944 v.p.

This memorandum summarizes, for record purposes, the results of a conference and demonstration of the directional radio sono buoy held at Quonset Naval Air Station on March 22, 1944. The demonstration was held on a flight from 11:30 a.m. to 4:00 p.m. Buoys were dropped from a PBM plane and their operation was observed with a submarine as the target. The buoys performed very well and the demonstration was considered successful.

D16/R748 574
GERJUOY, E.; VAN LENNEP, D. W.; and MACLAUGHLIN, R. R.
Evaluation of annealing of nickel III. Columbia Univ. - Div. of War Research
Mar. 24, 1944 9p.

Tests have been completed on samples of 3- by 0.035-in. nickel tubing produced and annealed by the International Nickel Company in connection with shipments of tubing being supplied to Hanovia (HSP-5861), Rolla (HSP-7603), Freed (HSP-9095), and Astatic (ASP-8684). The tests were performed by means of BARGE acoustic calibrations on hydrophones of the D16-Mark IV E and 5- by 3-in. toroidally wound types made from the samples of tubing. The hydrophone types and designations, as related to the above-mentioned orders, are indicated in the table in the report.

G20/R749 575
SNOW, W. B.
Measuring strength of a sound reflection.
Columbia Univ. - Div. of War Research
Feb. 14, 1944 1p.

A new method of measuring the strength of a sound reflection which uses the FM sonar principle, is discussed in this memorandum.

D24/R750 576
HARRISON, M.
Some investigations of isolation mounts for JP-1 sound-receiving equipment.
Columbia Univ. - Div. of War Research
N.D. 11p.

In connection with the use of the JP-1 sound-receiving equipment, it has been observed that the submarine's own noise is often one of the major factors limiting listening range. These observations have suggested the possibility that a portion of the disturbing noise is transmitted mechanically to the hydrophone. A rubber 'sandwich' mount, known as the Thurax Isolation Mount #1, has been inserted between the JP-1 hydrophone and the training shaft to isolate the mechanical vibrations. Graphs are included.

D24/R751 577
WESTNEAT, A. S.; HERRNFELD, F. P.; and RODGER, M. T.
Report of tests on the NL-115 (#EL 527-1) supersonic converter.
Columbia Univ. - Div. of War Research
Feb. 12, 1944 5p.

The electrical characteristics of the first of seven NL-115 supersonic converters have been tested. Several changes had to be made on the unit before the tests could be conducted. Graphs are included.

G12/R753 578
BERNIER, H. F.
Annealing of JP-1 (straight wood core) hydrophone.
Columbia Univ. - Div. of War Research
Feb. 26, 1944 4p.

The frequency response of two JP-1 hydrophones was measured without baffles. One of these was selected as an experimental model of annealing; the second was used as a control unit. The frequency responses were then remeasured. The results showed a 5 to 7 dB increase in sensitivity in the experimental unit over the control hydrophone. Graphs are included.

G12/R754
HARRIS, W. T.; EDWARDS, P. B.; and MACLAUGHLIN, R. R.
Depth-charge tests on hydrophones: effect of annealing on performance.
Columbia Univ. - Div. of War Research
Mar. 14, 1944 5p.

Depth-charge tests have been conducted to study the loss of sensitivity in JP-1 hydrophones resulting from shock demagnetization in depth charging and the effect of the reduction of coercive force due to annealing on this phenomenon. Charts are included.

G13/R775 580
VAN LENNEP, D. W.
Measurements of a QC-JK head.
Columbia Univ. - Div. of War Research
Feb. 14, 1944 v.p.

Measurements of a combination QC-JK head have been completed. The QC and the JK transducers were tested. Graphs are included.

D16/R756 581
WESTNEAT, A. S.
Test of field-strength meter
for an AN/CRT-1 ERSB.
Columbia Univ. - Div. of War
Research
Feb. 14, 1944 2p.

The Freed field-strength meter
for the AN/CRT-1 ERSB has been
tested. The meter shows sufficient
sensitivity for checking the
alignment of the buoys. The tuning
dial satisfactorily covers the
present frequency range. The unit
is sound electrically, but several
mechanical changes are necessary if
these units are to be used in the
field.

P35/R757 582
MACLAUGHLIN, R. R.
Tests on temperature-indicating
instruments on furnaces at USN -
USL and Connecticut Branch Company.
Columbia Univ. - Div. of War
Research
Feb. 22, 1944 2p.

On February 7, 1944, Mr. George
C. Rowe performed a calibration of
the temperature-indicating
instruments on the furnaces at this
Laboratory and at the Connecticut
Branch Company. The writer
participated in the tests at both
places and the results are outlined
in this memorandum.

P42/R758 583
LOYE, D. P. and WAGNER, R. A.
Noise and vibration
measurements of USS BREAM (SS243).
Columbia Univ. - Div. of War
Research
Feb. 8, 1944 18p.

Auxiliary machinery-vibration
measurements and water-noise
measurements of USS BREAM are
reported herein. These data were
taken with the boat in dock at the
Electric Boat Co., Groton, CT. Two

hydrophones and two vibration
meters were used simultaneously for
the measurements. It was
invariably found that the
hydrophone nearer to the
noise-producing auxiliary indicated
a higher level. No significant
variation of level with depth was
found. No correlation has been
attempted as yet between existing
noise and vibration data.
Recommendations are made regarding
possible future tests.

P42/R759 584
MANINGER, R. C. and KNUDSON, W. T.
Tests on 1- and 7- Mc
intercommunication systems of USS
PERCH.
Columbia Univ. - Div. of War
Research
Feb. 17, 1944 22p.

Noise measurements and
articulation tests were made on USS
PERCH to obtain information
regarding the existing
intelligibility of the 1- and 7-Mc
intercommunication systems and to
find possible methods to improve
these two systems. The tests
included noise measurements,
intelligibility tests, and others.
Improvements are suggested. Charts
and graphs are included.

D40/R760 585
GILLET, G. D. and SAWYER, O. E.
Maintenance of true-bearing
projector training.
Columbia Univ. - Div. of War
Research
Mar. 31, 1944 17p.

This report describes the
theory, development, and
application of the maintenance of
true bearing (MTB) feature as
developed at this Laboratory and as
used with sonar equipment for
surface vessels. The MTB training
system provides a means for
automatically maintaining the

orientation of the projector on any desired true bearing and, thus, the projector is made independent of changes in the ship's heading. Photos are included.

D24/R761 586
GERJUOY, E.

Performance of the JP-1 baffle at supersonic frequencies.
Columbia Univ. - Div. of War Research
Mar. 6, 1944 18p.

Experiments have been performed that identified the cause of irregularities in response of the JP-1 hydrophone and baffle in the range between 10 and 30 kc. A baffle has been constructed to give satisfactory performance in this range without adversely affecting the response at low frequencies. This report discusses the performance of this baffle.

P44/R762 587
BINGHAM, T. W. and SHERWOOD, D. M.
Report on PCO School at Submarine Base.
Columbia Univ. - Div. of War Research
Feb. 18, 1944 5p.

The authors attended the lectures given at the PCO (Prospective Commanding Officer) School at the New London Submarine Base. The students had had war-patrol experience and were now assigned to new-construction boats. These lectures were intended to familiarize the men with the latest developments in submarine tactical procedures and equipment. The report presents summaries of the lectures.

P29/R763 588
SHERWOOD, D. M. and BINGHAM, T. W.
Tests of WCA-2 submarine sound equipment aboard USS SHARK (SS-314) and USS SEA LION (SS-315).
Columbia Univ. - Div. of War Research
Mar. 24, 1944 6p.

Tests were made on USS SHARK (SS-314) and USS SEA LION (SS-315) to obtain response curves and beam patterns and to check driver tuning methods. Graphs are included.

D16/R764 589
FISH, P. E.
Submarine-listening ranges expendable radio sonobuoy.
Columbia Univ. - Div. of War Research
Feb. 19, 1944 8p.

This memorandum presents information on submarine-listening ranges through the expendable radio sonobuoy. The factors that determine listening ranges are the sound output of the vessel to be detected, the loss of sound level in its transmission through the water, the ambient background-noise level, and the recognition differential existing for the particular signal to be detected. A graph is included.

D51/R765 590
GERJUOY, E. and SEELEY, E. S.
Computations on BDI response.
Columbia Univ. - Div. of War Research
Feb. 21, 1944 12p.

This report summarizes an incomplete theoretical analysis of various BDI systems. The problem considered has been that of the interference (error) in BDI indications caused by the presence in the water of an unwanted signal in addition to that from the target ship. Graphs are included.

P32/R766 591
SNOW, W. B.
Conference at Submarine Signal
Company regarding high-frequency
projectors.
Columbia Univ. - Div. of War
Research
Feb. 23, 1944 3p.

This report discusses the
possibility of modifying present
submarine sonar equipment for echo
ranging in the 35- to 45-kc band.
It is felt that transducers can be
suitably modified within the
limited time that is available.

D51/R767 592
ARNDT, W. F.
Triangulation-Listening Ranging
(TLR) system.
Columbia Univ. - Div. of War
Research
Apr. 29, 1944 v.p.

The development of a completely
silent system for obtaining
bearings and ranges on moving
targets from a submerged submarine
has been undertaken. This system,
designated as triangulation-
listening ranging (TLR), consists
essentially of triangulating from a
baseline on the deck of a submarine
at the ends of which are located
hydrophones which have highly
directional sonic-listening
characteristics. The target
bearing information derived from
the hydrophones permits the
solution of the target's range and
bearing. Photos and drawings are
included in this completion report.

D16/R768 593
FISH, P. E.
Recommendations concerning ERSB
installations, conference at Bureau
of Aeronautics.
Columbia Univ. - Div. of War
Research
Feb. 22, 1944 5p.

Installations of ERSB's in
Naval aircraft were discussed.
Mockups already made on the PBM,
PBY-5, -5A, and the PV-1 were
discussed and recommendations were
offered for their improvement.

P21/R769 594
Specification for manufacture
of amplifier unit, as used in QFL
tactical range-recorder teacher.
Columbia Univ. - Div. of War
Research
Apr. 16, 1944 v.p.

This specification, with its
associated drawings and parts list,
covers the manufacturing
requirements for an amplifier unit
used with the Model QFL tactical
range recorder teacher. The
amplifier consists of a
preamplifier stage, a frequency
dividing network, three associated
channels, a signal printing
circuit, and a power supply circuit.

P42/R770 595
HERRNFELD, F. P.
Intercommunication amplifier
for USS SEA LION.
Columbia Univ. - Div. of War
Research
Feb. 23, 1944 3p.

This report describes an
amplifier designed and built to be
used in USS SEA LION as part of the
intercommunication system. The
input signal for this amplifier is
furnished by 13 high-impedance
magnetic microphones connected in
parallel. It has sufficient gain
and power output to drive 11 small
dynamic speakers in parallel.
Push-pull circuits and two
rectifier tubes are used to provide
a margin of safety. Electrical
specifications are included.

D20/R771 596
KROENERT, J. T.
QC-BDI rack test set.
Columbia Univ. - Div. of War
Research
Feb. 28, 1944 11p.

A combination oscillator and vacuum-tube voltmeter amplifier unit has been designed to be used for aligning and checking QC and BDI equipment. The oscillator, vacuum-tube voltmeter amplifier, and their power supply are constructed on a single chassis. It is recommended that the test unit and its associated equipment be housed in the Model 5C Harvard sound-gear monitor case. Since the unit is actually two separate instruments, the description covers each of the circuits involved and their functions.

D45/R772 597
GRIFFIN, R. H.
Tests of WEA-1 modified to 12
kc.
Columbia Univ. - Div. of War
Research
Feb. 21, 1944 1p.

This report discusses tests on echo-ranging equipment, a WEA-1 modified for 12-kc operation. The receiver's tuning range is from 10 to 14 kc. The projector is an RCA 14-in. PM model, split for BDI operation, and is housed in a WEA-2 dome with baffle modified to fit the WEA-1 strut. A total of 6 runs were made and maximum ranges of 3200 yd at 5 knots and 2800 yd at 15 knots were obtained. Other runs, later in the day, averaged about 1500 yd at 15 knots. The VBI or BDI, located in the training-control chassis, seemed to function quite well, giving good left and right indications. Echo quality was good, but a consistent 12-kc note was found to be audible from the speaker and loud enough to be objectionable. Water conditions were poor on this day and the

writer believes that the WEA-1 modified for 12-kc operation will outperform the standard 24-kc echo-ranging equipment.

D34/R774 598
BARKSON, J. A.
Conference regarding production of 100 directional radio sono buoys.
Columbia Univ. - Div. of War
Research
Feb. 29, 1944 7p.

This memorandum covers items discussed in a meeting on February 26, 1944, with Mr. George Rogers, Design Manager, Emerson Radio and Phonograph Corporation, by the writer and members of the D34 group, in regard to the manufacture of 100 directional radio sono-buoys by that company. It has been decided that this Laboratory will place an order with the Emerson Company for 100 buoys and also an additional 100 sets of parts to be used in the future fabrication of a second 100 buoys. Mr. Rogers was given a complete working buoy to use as a guide in preparing manufacturing plans for the 100 units. The discussion that followed covered the various items of this sample that need improvement. Suggestions were given regarding these improvements and one improvement was listed as a "must" for the first 100, if this could be done without delaying delivery. If delivery was to be appreciably delayed, such improvements would be held for incorporation in the second 100 units. Having the sample and the suggestions, the Emerson Company was requested to quote a basis on which an order can be placed.

D56/R775 599
HERRNFELD, F. P.
Coupling Bell Telephone
Laboratories ES0-54081 amplifier to
JK head.
Columbia Univ. - Div. of War
Research
Mar. 25, 1944 2p.

Four matching networks to
couple the outputs of two Bell
Telephone Laboratories ES0-54081
amplifiers to JK heads, installed
on USS SARDONYX and USS MARTHA'S
VINEYARD, were designed by the
Electronics Group. Maximum power
transfer was requested at 24 and
67.5 kc. The actual power output
is given.

D24/R776 600
WHITE, D. C.
Electrical interference in JP-1
system test procedures and limits.
Columbia Univ. - Div. of War
Research
Mar. 1, 1944 3p.

As a result of electrical
interference experienced in the
JP-1 equipment on USS BLUEGILL, the
test procedure described in the
memorandum was established and the
results obtained on five submarines
are shown. The hydrophone jack of
the JP-1 amplifier was terminated
with a 50-ohm shielded termination,
constructed as shown on the
attached sketch. The volume
control of the JP-1 amplifier was
turned to maximum gain. Voltages
were read at the speaker jack. A
vacuum-tube voltmeter, General
Radio Type 727-A, was used to read
the voltages, the input being
direct to the voltmeter terminals.
No termination was used. All tests
were made at the dock and the
normal auxiliaries of the submarine
were running at the time of the
test.

D16/R778 601
CLEARWATERS, W. and FISH, P. E.
Key West trials January 10 to
16, 1944.
Columbia Univ. - Div. of War
Research
Mar. 2, 1944 3p.

Sea trials were held at Key
West on January 10 to 16, 1944, to
obtain the information in the
memorandum. Existing data on
submarine-sound levels for
periscope depth versus speed were
to be checked. The theoretical
formula for obtaining the change in
level of cavitation sounds as the
boat's depth becomes greater was to
be checked. Submarine sounds
during the tests were to be
recorded over the AN/CRT-1 and
AN/CRT-1A buoys to be added to the
present training records. The
discriminator output of the
AN/ARR-3 receiver was to be
measured for each buoy model at
varying submarine ranges, speeds,
and depths. Special interest was
felt in the correlation of this
information with overloading of the
transmitters.

G12/R779 602
HARRIS, W. T.
Two "thimble" hydrophones.
Columbia Univ. - Div. of War
Research
Mar. 6, 1944 7p.

Small nondirectional sound-
field probes have led to the
construction of the two small
hydrophones described in this
report. Both hydrophones are
constructed around hard
(unannealed) nickel cylinders 1-in.
long with a 3/4-in. diameter and
0.010-in. wall thickness. These
were wound toroidally with #30
enameled wire, approximately 250
turns. A photograph assists in the
description of the unit. The
performance characteristics are
given.

D24/R780 603
WHITE, D. C.
JP-1 equipment inspections and
operator training.
Columbia Univ. - Div. of War
Research
Mar. 3, 1944 10p.

This memorandum deals with
activities of the JP-1 group of the
New London Laboratory in the
inspection and tests of JP-1
topside listening gear and with
on-the-job training of operators in
the use of this type of gear, as
applied to new-construction
submarines. The period covered by
this report is from February 1 to
February 15, 1944, inclusive. The
submarines inspected were USS
GABILAN (SS-252), USS BREAM
(SS-243), USS BANG (SS-385), USS
PERCH (SS-313), and USS SHARK
(SS-314). Each inspection is
treated separately and a summary of
observations is made at the end of
this report. Attached are samples
of the forms used for dockside and
sea-trip inspections.

D24/R781 604
RODGER, M. T. and HERNNFELD, F. P.
Field-test and alignment
specifications for use with NL-115A
supersonic converter.
Columbia Univ. - Div. of War
Research
Mar. 6, 1944 7p.

This report covers the
procedure that should be followed
in field testing and circuit
alignment of the Model NL-115A
supersonic converter. A schematic
diagram of this unit is included.

D24/R782 605
RODGER, M. T.
Modifications to be performed
on supersonic converters, Model
NL-115A, Serial Nos. EL-527-1,
EL-527-2, and EL-527-4.
Columbia Univ. - Div. of War
Research
Mar. 6, 1944 3p.

Three NL-115A supersonic
converters which have been shipped
to H. H. Baker, Pearl Harbor,
required electrical changes as
outlined in the report.

D24/R783 606
RODGER, M. T.
Modifications of JP-1 amplifier
to accommodate the NL-115A
supersonic converter.
Columbia Univ. - Div. of War
Research
Mar. 6, 1944 3p.

This memorandum is provided for
guidance in the modification of the
120-V dc-operated Model JP-1
(NL-105) amplifiers to accommodate
the model NL-115A supersonic
converters. Figures and drawings
are included.

D24/R784 607
RODGER, M. T.
Installation of control box
used in conjunction with Armour
wire recorder and JP-1 amplifier.
Columbia Univ. - Div. of War
Research
Mar. 6, 1944 2p.

This memorandum is provided for
guidance in the installation of the
control box used in conjunction
with the Armour wire recorder,
Model 50, and the JP-1 amplifier.
Directions for the installation are
included.

D53.2/P42/R785 608
WESTNEAT, A. S.
Bridging amplifier for Sound
Apparatus company recorder.
Columbia Univ. - Div. of War
Research
Mar. 7, 1944 2p.

The amplifier characteristics
are given in this report. A
schematic diagram of the unit is
attached.

P42/R787 609
WAGNER, R. A.
Calibration of sound meter and hydrophones.
Columbia Univ. - Div. of War Research
Mar. 9, 1944 2p.

A calibration of the General Radio sound level meter and the hydrophone used by the Electric Boat Company for submarine-noise measurements was made on BARGE on February 29, 1944. The determination of the frequency characteristic consisted of single-frequency measurements distributed between 100 and 4000 cycles. Above this higher limit, water noise so closely approached the BARGE sound field that no valid measurements could be made.

P34/R788 610
HARRISON, M.
Hydrophone preamplifier for W.H.O.I.
Columbia Univ. - Div. of War Research
Mar. 9, 1944 1p.

The amplifier is a two-stage resistance-capacity coupled device, operating from self-contained batteries with an expected life of 100 hrs. It is of cylindrical shape, 13 in. in length and 3-5/8 in. in diameter. The electrical characteristics are given.

P26/R789 611
GILBERT, F. E. and NUNAN, J. K.
Relative echo intensity versus aspect.
Columbia Univ. - Div. of War Research
Mar. 10, 1944 8p.

A series of echo-ranging tests were made from USS SARDONYX, using USS S-48 as a target, in Long Island Sound during December of 1942 and January 1943. The objects of these tests were numerous, but

the information listed herein constitutes the results of an analysis made in August 1943 of the single investigation of echo intensity versus aspect.

34/R791 612
HERRNFELD, F. P.
Input transformer for directional radio sono buoy.
Columbia Univ. - Div. of War Research
Apr. 10, 1944 2p.

An input transformer has been designed for the directional radio sono buoy. It has an impedance ratio of 8 to 60,000 ohms and gives a voltage step-up ratio of 33.5 dB at 1000 cps from a 2-ft split toroidally-wound hydrophone. A graph is included.

D17/R790 613
KROENERT, J. T.
Characteristics of Model 755 receiver of USS SHARK.
Columbia Univ. - Div. of War Research
Mar. 9, 1944 2p.

The frequency-response and gain-control characteristics of the Model 755 receiver located in the conning tower of USS SHARK have been measured. A graph is attached to the report.

D54/R792 614
COLE, A. R.
Internal-communication amplifier for USS BREAM.
Columbia Univ. - Div. of War Research
Mar. 10, 1944 2p.

An amplifier that will be used on USS BREAM as part of the internal-communication system has been designed and built. A graph is included.

P29/R793 615
SNOW, W. B. and GERJUOY, E.
Calculated echo and detection
ranges as a function of frequency.
Columbia Univ. - Div. of War
Research
May 30, 1944 v.p.

It has been suggested that
existing equipment be modified to
enable our submarines to echo range
at higher supersonic frequencies.
This study began originally as an
investigation of the maximum
possible echo ranges that might be
expected, both with standard
equipment and with the proposed
modified equipment, in the 10- to
60-kc band. It soon became evident
that the maximum attainable echo
ranges were not, in themselves, as
significant as when accompanied by
curves of expected detection ranges.

P33/R794 616
MANINGER, R. C.
Maximum-listening ranges of
underwater-sound equipment.
Columbia Univ. - Div. of War
Research
Mar. 13, 1944 11p.

This report has compiled some
of the available information
regarding maximum-listening ranges
of sonic and supersonic equipments
in both deep and shallow waters.
The sources of information were war-
patrol reports from submarines in
the Pacific, patrol reports of
Coast Guard vessels using
through-the-hull gear, and reports
of listening tests conducted by
members of the Laboratory. Tables
are included.

D24/R795 617
GRIFFIN, R. H.
Visit to Portsmouth Navy Yard.
Columbia Univ. - Div. of War
Research
Mar. 13, 1944 2p.

The purpose of this visit to
Portsmouth Navy Yard, Portsmouth,
NH, was to (1) inspect two
completed JP-1 installations, (2)
determine the methods used to
install and align the latest type
of JP-1 training gear, (3)
determine the setup and personnel
involved in JP-1 sound-operator
training school, and (4) provide
such instruction to officers or
personnel as may be desired.

D54.2/P42/R796 618
HANSON, R. O.
Report of findings on the
internal-communication system of
the submarine BREAM.
Columbia Univ. - Div. of War
Research
Mar. 13, 1944 5p.

Columbia University was
requested by the Navy Department to
correct difficulties that existed in
the talk-back communication system
aboard USS BREAM. The system that
had been used on BREAM was an
adaptation of a standard
interoffice communication system
known as the 'Executone'. This
report discusses modifications that
were made to improve the system.
It also lists points found in BREAM
that may be applicable to other
submarines with similar
installations.

G12/R797 619
HARRIS, W. T.; EDWARDS, P. G.; and
VAN LENNEP, D. L.
Two BDI hydrophones.
Columbia Univ. - Div. of War
Research
Mar. 9, 1944 14p.

The performance characteristics
of two BDI hydrophones recently
constructed in the New London
Laboratory are reported in this
memorandum. They represent two
types of construction, both of
which perform well and can be
readily manufactured. In a BDI

hydrophone, the principal point of interest is the exactness with which the two halves match in voltage amplitude and phase. In both of the hydrophones discussed here, the matching in each of these respects appears to be practically perfect.

D16/R798 620
MACLAUGHLIN, R. R.; VAN LENNEP, D. W.; and SUTER, H.

Effect of tape ties upon the acoustic functioning of the M-7/CRT-1A hydrophone. Columbia Univ. - Div. of War Research Mar. 20, 1944 3p.

The recommended manufacturing requirements for the 5- by 3-in. straight toroidally wound hydrophone specify that the winding shall be bound to the tube at the center by two turns of wax-free cotton cord. It has been found in drop tests that the force of the water on impact pushes the tie off the hydrophone. A calibration test was run on E-14, an M-7/CRT-1A unit of Emerson manufacture, with the tapes and without. There were no adverse effects on the unit.

D16/R799 621
MACLAUGHLIN, R. R. and VAN LENNEP, D. W.

Effect of shell painting upon the acoustic functioning of the M-7/CRT-1A hydrophone. Columbia Univ. - Div. of War Research Mar. 20, 1944 2p.

The recommended manufacturing requirements for the 5- by 3-in. straight toroidally wound hydrophone specify that the nickel tube shall be painted with one coat of dull black primer. This memorandum outlines the results of acoustic tests made on a sample coating submitted by the Freed

Radio Corporation, one of the Navy's contractors on this equipment.

D16/R800 622
MACLAUGHLIN, R. R. and VAN LENNEP, D. W.

Tests on five D16/Mark IV-E hydrophones (series I). Columbia Univ. - Div. of War Research Mar. 29, 1944 7p.

Tests have been made on five production-model D16 Mark IV-E hydrophones for use with the ERSB. The tests were made on September 3, 1943. The hydrophones were received as part of AN/CRT-1 equipments and were tested following drop tests of the buoys. Three were of Rola manufacture, nos. R11147, R11199, and R11594; and two were of Hanovia manufacture, nos. H5579 and H5692. All are so identified on the accompanying curve sheets. Calibrations were run on these units as retrieved from the drop tests and again after remagnetization. The performance characteristics of the individual units after remagnetization are shown on the curve sheets, figs. 1 to 6, inclusive.

D16/R801 623
MACLAUGHLIN, R. E. and VAN LENNEP, D. W.

Tests on five M-7/CRT-1A hydrophones (series 2). Columbia Univ. - Div. of War Research Mar. 24, 1944 12p.

Tests have been made on five units of the initial production of the 5- by 3-in. straight toroidally wound ERSB hydrophones manufactured by the Astatic Corporation. Acoustic calibrations were made on BARGE on the units after magnetization and immersion in wetting agent. The performance

characteristics of each unit are shown on curve sheets. The measured values of insulation and coil resistance were satisfactory. The constructional features, to the extent that they could be checked without destruction of the units, appeared to conform to the specifications except that the tubes had not been painted.

D16/R802 624
MACLAUGHLIN, R. R. and VAN LENNEP, D. W.

Tests on 15 M-7/CRT-1A hydrophones (series 3).
Columbia Univ. - Div. of War Research
Mar. 30, 1944 19p.

Tests have been made on 15 units of the initial production of the 5- by 3-in. toroidally wound ERSB hydrophones manufactured by the Astatic Corporation. The tests were made after the buoys, which had been supplied complete with hydrophones, had been drop tested. Acoustic calibrations were made on BARGE on the units as retrieved and again after remagnetization. The performance characteristics of each unit after remagnetization are shown on curve sheets. The measured values of insulation resistance to sea water varied from 2500 ohms to several megohms. The constructional features, to the extent that they could be checked without destruction of the units, appeared to conform to the specifications except that the tubes had not been painted. The tape ties, presumably installed in the proper manner, were broken or loose on many of the units and other methods of fastening the wires are being investigated.

G12/R804

625

HARRIS, W. T.

The straight toroidally wound plastic-covered magnetostriction hydrophone.

Columbia Univ. - Div. of War Research
June 15, 1944 28p.

This report summarizes the development of a method of manufacture of the straight toroidally wound plastic-covered hydrophone and briefly describes some improvements in the construction that have been made since commercial manufacture was initiated. Detailed manufacturing specifications have been prepared and are being used by a manufacturer designated by the Bureau of Ships.

G12/R805

626

HARRIS, W. T.; VAN LENNEP, D. W.; and MACLAUGHLIN, R. R.

A comparison of some possible materials for use in JP-1 baffles. Columbia Univ. - Div. of War Research
Mar. 15, 1944 9p.

In the early development of the JP-1 baffle, a survey of blanket materials was made. These were judged by the discrimination and gain in the audio range. The materials studied may be classed broadly as various grades of air-filled rubber, cork-filled rubber, and linoleum. Based on a belief that the function of the blanket is to provide a back side of the baffle that is an absorbent reflector and that the problem is really one of extending this property as low in the frequency spectrum as possible, it seemed worthwhile to try other materials that would present to the water an interface of greatly reduced impedance, together with a large damping factor. Any structurally soft material containing mostly finely divided air would seem worth

investigating. The damping is believed to be mainly due to transfer of adiabatic heat from the gas to the solids in the blanket material.

D54/R806 627

PROUDFOOT, D. A.

Brief outline of program USS SEA LION internal-communication systems.

Columbia Univ. - Div. of War Research

Mar. 15, 1944 3p.

It is the purpose of this memorandum to outline the proposed work to be done in connection with the adjustment and testing of the 7-Mc and the special-talkback systems installed on USS SEA LION (SS-315). The purpose of the program is to answer qualitatively the question as to which system should be recommended for use on other submarines.

D24/R807 628

SHERWOOD, D. M.

Tests of JP-1 installation on USS SHARK (SS-314).

Columbia Univ. - Div. of War Research

Mar. 15, 1944 3p.

This report describes tests made of the JP-1 equipment on USS SHARK during the period March 4 to 6, 1944, with the boat operating out of Newport, R.I. J. B. Bardner, W. Perine, G. W. Martin, and D. M. Sherwood, of the New London Laboratory, and A. C. Vines, of Woods Hole Oceanographic Institution, boarded the boat at 1700, 4 March 1944, to make deep-sea tests of sound and DCDI equipment. This report summarizes the tests made on the JP-1 equipment.

D24/R808

629

HERRNFELD, F. P.

Description of NL-117 amplifier. Columbia Univ. - Div. of War Research

Mar. 16, 1944 22p.

A description of the NL-117 amplifier is given in this report. The amplifier was designed for both sonic and supersonic listening. Changes that should be made are given.

P37/R809

630

HANSON, R. O.

The General Electric Model 20N wire recorder.

Columbia Univ. - Div. of War Research

Mar. 17, 1944 13p.

Work was done at the New London Laboratory on this recorder to improve its frequency response. The 20A and 20N recorders are very similar mechanically and electrically and the general description of the 20A still applies to the type 20N unit. A schematic diagram of the unmodified 20A circuit arrangement is included. The changes made to the 20N recorder are given.

D53/R810

631

WAGNER, R. A.

Low-pressure blower-noise measurements on USS BARBEL.

Columbia Univ. - Div. of War Research

Mar. 18, 1944 12p.

Underwater-noise measurements of the low-pressure blower of USS BARBEL, with the blower operating under several conditions, were made from 0000 to 0700 on February 18, 1944, at the North Yard of the Electric Boat Company, in cooperation with engineers of the Electric Boat Company, the Roots-Connersville Blower Corporation, and the New London Laboratory.

These measurements were made because of complaints that the blower noise within the submarine was excessive. The primary purpose of the measurements was to find out what difference in amount and quality of noise transmitted into the water would result from using several types of mufflers on the blower output. Secondly, it was desired to determine the variation of noise with hydrophone location along the boat and to add to the general information on submarine auxiliary-equipment underwater noise.

D16/R811 632
BARKSON, J. A.
TBF ERSB drop tests, March 9 to 11, 1944.
Columbia Univ. - Div. of War Research
Mar. 18, 1944 6p.

This memorandum discusses the results of buoy drop tests made in the Thames River at the New London Laboratory from a TBF plane in the period March 9 to 11, 1944. All drops were made by launching the units from the bomb bay. The buoys were mounted in the bomb bay using two metal bands attached to the buoys and properly spaced to fit the normal bomb shackles.

P32/P33/R812 633
SNOW, W. B. and HOFF, H. B.
USS SHARK, noise versus speed tests.
Columbia Univ. - Div. of War Research
Apr. 12, 1944 11p.

This memorandum describes the methods employed and the results obtained in a series of tests made by Messrs. W. Perine and J. B. Gardner on March 5, 1944, aboard the submarine USS SHARK. The opportunity for these measurements was presented in connection with tests on the depth charge direction

indicator equipment (DCDI). These tests were performed on the WCA equipment installed on USS SHARK, using the JK face of the QC-JK transducer. Readings of noise level were taken on the volume indicator associated with the 755 receiver.

P39/R813 634
Preliminary installation instructions for the recorder-trace projector.
Columbia Univ. - Div. of War Research
Mar. 25, 1944 11p.

The recorder-trace projector has been designed for the purpose of instructing groups of students in the operation of the sound range recorder. It consists essentially of an enlarged reproduction of the analyzer and control mechanism of the sound range recorder, this reproduction being mounted vertically to serve as a screen on which are projected the range traces of an operating Sangamo Electric Company sound range recorder. The range traces are projected from the recorder by means of a commercial opaque projector so modified that it can be fitted directly over a Sangamo Electric Company sound range recorder.

G27/R814 635
NUNAN, J. K. and SNOW, W. B.
A discussion of fundamental concepts pertinent to the design of submarine-sonar gear.
Columbia Univ. - Div. of War Research
Apr. 3, 1944 24p.

The graphs of this series, which present data on transducer characteristics and transmission loss, were made from data accumulating at the New London Laboratory. Work is continuing along these lines. The data

presented may logically be considered as indicative of the effects but should not be taken as representing complete accuracy in absolute values.

D24/R815 636
WHANNEL, R. L.
JP-1 inspection and training on
USS CAVALLA.
Columbia Univ. - Div. of War
Research
Mar. 23, 2p.

This memorandum describes the training of operators for JP-1 sonic-listening gear and the operation of the gear under conditions at sea.

D51/R816 637
ARNDT, W. F.
Triangulation - listening -
ranging (TLR).
Columbia Univ. - Div. of War
Research
Mar. 20, 1944 3p.

This memorandum reviews the entire development and construction progress made by the Sperry Gyroscope Co. in connection with that company's contract to supply a range solver, a range recorder, and suitable servo mechanisms for the TLR project. The subjects discussed at the conference and the apparatus shown by the Sperry engineers are described in the report.

D24/R817 638
GRIFFIN, R. H.
JP-1 inspection and training on
USS SEA LION.
Columbia Univ. - Div. of War
Research
Mar. 20, 1944 1p.

This memorandum describes R. H. Griffin's inspection of the JP-1 sonic-listening equipment and sound operators on USS SEA LION.

D16/R818 639
SUTER, H.
Tests made on USS SEMMES,
DE-180, and DE-157 during January
1944 of factors affecting use of
ERSB by surface vessels.
Columbia Univ. - Div. of War
Research
Mar. 21, 1944 op.

This memorandum summarizes the results of tests made during January, 1944, on USS SEMMES, DE-180, and DE-157. These tests were made to determine (1) the radio range which could be expected by surface craft equipped with radio receivers, AN/ARR-3, for listening to ERS buoys (AN/CRT-1); and (2) the distance from the buoy which a DE would be required to go in order not to hear its own-ship's noises. Various interfering factors were encountered during some of these tests; so additional tests were recommended. Approximate radio ranges were obtained, and certain factors were encountered that limit the use of the present models of the ERS buoys by surface vessels.

D24/R819 640
HERRNFELD, F. P.
Regulated power supply for
NL-105 amplifier
Columbia Univ. - Div. of War
Research
Mar. 20, 1944 2p.

The Electronics Group designed a power supply to be used with an NL-105 amplifier. The power supply is line and load regulated. The characteristics are shown on figure 1. Without load and with the line voltage at 115 V the unit draws 107.5 W. Under full load, 325 ma at 114 V, the unit draws 235 W. The latter corresponds to an efficiency of 16.1 percent. It is recommended that, if more units of this type are built, the current-carrying capacity of the choke coils should be increased. Better ventilation should be provided.

D24/R820 641
WHITE, D. C.

Use of recordings in connection with JP-1 sound-receiving equipment for training personnel.
Columbia Univ. - Div. of War Research
Mar. 21, 1944 3p.

This memorandum describes the use of sound recordings of underwater sounds through the JP-1 amplifier for training of sound operators. This method of training was tried on submarines and it was suggested that this could also be used in a classroom.

D16/R821 642
ARCHER, G. W.

Modification of the Model R-2/ARR-3 ERSB for 12-channel operations.
Columbia Univ. - Div. of War Research
Mar. 21, 1944 5p.

This memorandum discusses the feasibility of modifying the Model R-2/ARR-3 ERSB receiver for 12-band operation. Tested before and after modification were sensitivity, automatic frequency control, image rejection, and alignment. It was concluded that the receiver could be modified for 12-channel operation. No calibration data are included.

D12F/R822 643
SNOW, W. B.; HOFF, H. B.; and MARKHAM, J. J.

Transmission measurements in the vicinity of San Diego, CA.
Columbia Univ. - Div. of War Research
Sept. 20, 1944 v.p.

This report presents the acoustical data taken by CUDWR during a cooperative measurement program conducted with UCDWR and MITDIC in the vicinity of San Diego. In addition to obtaining

fundamental transmission data, these tests had as an objective the comparison of the measurement equipments of CUDWR and UCDWR. Background-level comparisons were also made. Substantial agreement was obtained between the measurements of the participating groups. Evidences of the Lloyd Mirror effect were found at low frequencies. It was also found that, despite the great depths (500 to 4000 ft), reflections from the bottom contributed significantly to the received-sound intensity for all frequencies measured (600 cps, 2 kc, 8 kc, and 20 kc).

D51/R823 644
ARNDT, W. F.

Analyses of bearing-deviation indicator (BDI) systems.
Columbia Univ. - Div. of War Research
Mar. 22, 1944 8p.

This memorandum covers the four best-known systems of obtaining BDI, namely, SLC, PAL, RLI, and NRL. The early work on SLC (simultaneous-lobe comparison) was done by the Harvard Underwater Sound Laboratory. The Bell Telephone Laboratories originated the PAL (phase actuated locator), while the RCA Mfg. Co. suggested the RLI (right-left-indicator) system. The Naval Research Laboratory originated the NRL system. Attention is paid to the use of BDI systems on submarines for listening to propeller noise, rather than for use with echo-ranging systems. The analyses presented in chart and discussion form are incomplete. Further information, studies, and sea trials are necessary before complete analyses and summaries can be made. Information regarding the NRL system is the least complete. A set of block diagrams have been included with the report as an aid in visualizing the similarities and differences between the several systems.

D55/R824 645
ARNDT, W. F. and SAWYER, O. E.
Modification of submarine-sonar
equipment RLI applied to QB
projector with JP-1 and QC-JK
operator in forward torpedo room.
Columbia Univ. - Div. of War
Research
Mar. 24, 1944 8p.

This memorandum discusses in
some detail proposed modifications
for increasing the effectiveness of
sonar equipment on existing
submarines having WCA, WCA-1, or
WCA-2 supersonic listening-ranging
gear and JP-1 sonic-listening gear.

D55/R825 646
ARNDT, W. F. and SAWYER, O. E.
Modification of submarine-sonar
equipment RLI applied to QB
projector with JP-1 listening gear
installed in conning tower.
Columbia Univ. - Div. of War
Research
Mar. 23, 1944 8p.

This memorandum discusses in
some detail proposed modifications
for increasing the effectiveness of
sonar equipment on existing
submarines having WCA, WCA-1, or
WCA-2 supersonic listening-ranging
gear and JP-1 sonic-listening
gear. The desirable features of
modification and proposed
modifications are described. A
description of added equipment and
a discussion of this equipment is
included.

D55/R826 647
ARNDT, W. F. and SAWYER, O. E.
Modification of submarine-sonar
equipment RLI and power training
for JP-1 gear.
Columbia Univ. - Div. of War
Research
Mar. 24, 1944 9p.

This memorandum discusses in
some detail proposed modifications
for increasing the effectiveness of

sonar equipment on existing
submarines having WCA, WCA-1, or
WCA-2 supersonic listening-ranging
gear and JP-1 sonic-listening
gear. The desirable features of
modification and a description of
added equipment are included.

D24/R827 648
HARRIS, W. T.; VAN LENNEP, D. W.;
and MACLAUGHLIN, R. R.
Buna S blankets for JP-1
baffles.
Columbia Univ. - Div. of War
Research
Mar. 23, 1944 3p.

Since neoprene has become
scarce and Buna S more plentiful,
it has become necessary to
substitute Buna S for neoprene
wherever possible. Buna S has
lower tensile strength and poorer
life in sunlight, but higher
resilience and a much lower
freezing temperature. Buna S is to
be expected to give better acoustic
performance than neoprene. The
tensile strength and life of Buna S
are entirely adequate for this
application. Tests were conducted
and recommendations made.

D16/R832 649
MACLAUGHLIN, R. R. and JASPER,
H. N.
An acoustic test box for the
ERSB.
Columbia Univ. - Div. of War
Research
Aug. 26, 1944 4p.

For production testing, as well
as preflight checking of the
AN/CRT-1A expendable radio sono
buoy, there is considerable need
for an overall test from acoustic
input to RF deviation. This
memorandum describes equipment and
procedures applicable for such
testing.

D55/R828 650
ARNDT, W. F. and SAWYER, O. E.
Modification of submarine-sonar
equipment, discussion of proposals
made in memoranda for file
D55/R824, 825, and 826.
Columbia Univ. - Div. of War
Research
Mar. 23, 1944 5p.

This memorandum discusses the
relative merits of three proposed
modifications to submarine-sonar
equipment covered separately by
memorandums D55/R824-645,
D55/R825-646, and D55/R826-647.
Tables are included that rate the
three proposals on a relative
basis, considering the three
requirements of tactic, time, and
space.

D16/R829 651
ARCHER, G. W.
Electrical tests of ERSB model
AN/ARR-3 receiver.
Columbia Univ. - Div. of War
Research
Mar. 27, 1944 15p.

Electrical tests were performed
on Model AN/ARR-3 receivers to
recommend changes in the receiver,
if necessary to improve the
performance. Sensitivity
measurements were made and the
calibration of each unit was
performed. The frequency limits of
the colored dial markers were
determined. The degree of
'hold-on' of the automatic
frequency-control circuits was
measured, along with selectivity,
intermediate frequency,
discriminator characteristic, and
image rejection. It was concluded
that it would be questionable if
any minor improvement in the design
is worthwhile. If improved
performance is desired, radical
changes are necessary.

D50/R830 652
HERRNFELD, F. P.
Recommendations for the UCDI.
Columbia Univ. - Div. of War
Research
Mar. 24, 1944 5p.

This is a report on a
theoretical study of the depth
charge direction indicator to
determine if circuit changes can be
made that will improve efficiency
or reliability. Hydrophone
characteristics were investigated
to determine if it is possible to
eliminate the DCDI amplifier
circuit, which has a gain of
approximately 16 dB, without
reducing the range of the equipment.

D16/R831 653
MACLAUGHLIN, R. R. and VAN LENNEP,
D. W.
Evaluation of annealing IV.
Columbia Univ. - Div. of War
Research
Mar. 30, 1944 3p.

Tests have been completed on
samples of nickel tubing, 3 in. in
diameter with a wall thickness of
35 mils, produced and annealed by
the International Nickel Company,
in connection with shipments to the
Astatic Corporation for use in the
construction of the M-7/CRT-1A
hydrophone.

D16/R835 654
MASON, R. I.
Directional radio sono-buoys.
Columbia Univ. - Div. of War
Research
Mar. 25, 1944 2p.

This report summarizes
potential possibilities for usage
of expendable directional radio
sono-buoys. Advantages are pointed
out and it is explained how this
unit could be modified for aircraft
use.

D55/R836
GLENNAN, T. K.

655

A proposal for a modification of existing submarine-sonar equipment.
Columbia Univ. - Div. of War Research
Mar. 23, 1944 14p.

This proposal deals with features that should be engineered into the WFA system. The proposed plans involve (1) application of an RLI (right-left indicator) system to either the JP-1 sonic-listening gear or the QB echo-ranging transducer; (2) provision of an instantaneous talkback and hydrophone sound and bearing repeater system between the conning tower and the sonar operator in the forward torpedo room; (3) installation of a JP-1-QB "differential bearing repeater" in the conning tower; and (4) addition of a supersonic converter (8 to 65 kc) to the JP-1 equipment.

D24/R837

656

Maintenance and trouble-shooting instructions for Models JP-1, JP-2, and JP-3 sound-receiving equipment.
Columbia Univ. - Div. of War Research
N.D. 109p. and 3p. of corrections

This instruction book contains the necessary information for the care and upkeep of the Model JP-1 sound-receiving equipment. This manual describes the function of the circuit, the testing of it, and gives color codes and parts list.

D51/R838

657

NOSKER, L. W.
Summary of schematic drawings and operation of ST3 triangulation listening and ranging system.
Columbia Univ. - Div. of War Research
Mar. 29, 1944 11p.

This report is issued for the purpose of providing a summary of schematic drawings of the ST3 triangulation listening and ranging system, together with a brief description of its operation. This information is correct as of February 5, 1944.

D12/R839

658

HOFF, H. B. and COLE, D. L.
Statistical analysis of water-noise measurements made in Block Island Sound and the approaches to New York Harbor.
Columbia Univ. - Div. of War Research
Apr. 7, 1944 6p.

During the New York Harbor, Fishers Island, and Block Island transmission surveys, many background-spectrum measurements were made. The background-spectrum data that were taken on these surveys were examined critically to determine which spectra were obtained during the absence of interfering noises, such as ships or other man-made noise. Out of 238 cases, 34 spectra were found that were thought to be attributable to water noise only. Of this number, 16 were taken from the Block Island data. The distribution of the selected cases is given. Graphs of the statistical distribution of overall water noise and curves are included.

P41/R841

659

General specification for periscope trainer.
Columbia Univ. - Div. of War Research
July 11, 1944 4p.

This specification covers the manufacturing requirements for a periscope trainer. The periscope trainer is an instrument for training students in the use of the periscope for determining range, bearing, aspect, and identification

of observed targets. It consists of an optical system mounted in an assembly that is similar in appearance to a U.S. Navy Type II periscope; a rotating target drum, around which is wrapped a translucent film having pictures of target ships; an eyepiece with a ray-filter selector; and two variable-speed motors to rotate the target drum and to tilt parts of the optical system to simulate roll of the observing ship.

D24/R844 660
WHITE, D. C.

Multiple jacks for use in connection with JP-1 operator training.
Columbia Univ. - Div. of War Research
Apr. 5, 1944 2p.

This report details the necessity of having multiple jacks for JP-1 equipment for training purposes. Drawings of the jacks are included.

D51/D55/R845 661
ARNDT, W. F.

Discussion of balance requirements of hydrophones used with an RLI type of BDI.
Columbia Univ. - Div. of War Research
Apr. 10, 1944 9p.

For the purpose of making accurate bearing studies in connection with the development of the triangulation-listening-ranging (TLR) system, it was necessary to use a BDI system that could be designed and constructed in the minimum amount of time. Studies of the several known BDI systems led the New London Laboratory to decide on what is now called the RLI system (right-left indicator) because, if the amplitude balance between the hydrophone halves is maintained to better than 1 dB, a relative phase drift between

amplifier channels of as much as about 6 degrees electrical could occur during the test runs without introducing a bearing drift of more than 0.05 degree.

D53/R846 662
NUNAN, J. K.

An interim statement of the noise level monitor (NLM).
Columbia Univ. - Div. of War Research
Apr. 3, 1944 4p.

This memorandum details a meeting held to discuss the development of a noise-level monitor (NLM). The agenda of the meeting is included. An outline of the discussion is also attached.

D34/R847 663

Preliminary development specification for cylindrical toroidally wound magnetostriction hydrophone and baffle.
Columbia Univ. - Div. of War Research
Apr. 7, 1944 8p.

This specification covers the manufacturing requirements for developmental models of a hydrophone consisting of two plastic-coated cylindrical toroidally wound magnetostriction hydrophone units, electrically connected in series, and their associated baffles. The hydrophone unit consists of a seamless nickel tube 1-3/4 in. in diameter and 12-in. long, having a wall thickness of 0.025 in. wound toroidally parallel to the tube axis with 83 turns of #22 solid-copper insulated wire.

D24/R848
SAWYER, C. R.

664

Requirements for NL-117A
sonic-supersonic Ac-operated
amplifier for submarines.
Columbia Univ. - Div. of War
Research
Apr. 5, 1944 5p.

This memorandum states the
requirements for the NL-117A
listening amplifier for submarines
that will operate in the sonic and
supersonic frequency ranges from a
3-ft straight toroidally wound
hydrophone and an Ac power source.
It is expected that the NL-117A
amplifier will become part of the
WFA sonar equipment, for new
submarines, being designed by the
Submarine Signal Company, or become
part of a sonar-improvement program
applying to existing WCA or JP-1
types of equipment.

D54/R849
PROUDFOOT, D. A. and TEAL, E. E.
Brief tests on USS BARBEL
(SS316) 7-Mg system.
Columbia Univ. - Div. of War
Research
Apr. 5, 1944. 2p.

665

Tests were made on USS BARBEL
(SS316) on March 30, 1944, to
investigate the optimum location of
7-Mc speakers in the control room
and conning tower for elimination
of acoustic feedback. It was found
that the most critical feedback
condition arose when the conning-
tower unit was used as a microphone.

D53/R850
WAGNER, R. A.
Operating procedure for noise
analyses using Model OAY sound-
measuring equipment, RA277
analyzer, and Sound Apparatus
Company recorder.
Columbia Univ. - Div. of War
Research
Apr. 6, 1944 2p.

666

The operating procedure for the
analyses is described. Calibration
instructions for the equipment are
given and a diagram of the
equipment is attached.

D34/R851
BARKSON, J. A.

667

Directional radio sono buoy
conference and demonstration,
ASDEVLANT, Quonset NAS, March 22,
1944.
Columbia Univ. - Div. of War
Research
Mar. 30, 1944 v.p.

This report summarizes briefly
the results of a conference and a
demonstration of the directional
radio sono buoy held at Quonset
Naval Air Station on March 22,
1944. The demonstration was held
on a flight from 11:30 a.m. to 4:00
p.m., during which buoys were
dropped from a PBM plane and their
operation was observed with a
submarine as the target. The buoys
performed very well and the
demonstration was considered
successful.

G12/R852
HARRIS, W. T.; VAN LENNEP, D. W.;
and EDWARDS, P. B.

668

General-purpose nondirectional
sonic magnetostriction hydrophones.
Columbia Univ. - Div. of War
Research
Apr. 10, 1944 16p.

Nondirectional sonic
magnetostriction hydrophones are
useful for listening and measuring
in the sonic range and in the
supersonic range up to 20 kc. The
construction and performance of
these units are described. A
photograph is included.

G12/R853 669
THURAS, A. L.
Permanent-magnet core
blastphone.
Columbia Univ. - Div. of War
Research
Apr. 6, 1944 4p.

This memorandum describes two permanent-magnet blastphones for use in the DCDI which have been constructed and tested. Two internal changes were made. The five 14-mil soft iron core laminations were replaced by three 1/6-in. Vicalloy laminations. The coil turns were reduced from 500 to 212 and they were wound close to the inside of the nickel tube. The nickel tube was heat treated at 1650°F for 1/2 hr. Figures are included showing the responses of the hydrophones.

D54/R854 670
COLE, A. R.
Internal-communication system
amplifier for USS CAVALLA.
Columbia Univ. - Div. of War
Research
Apr. 7, 1944 3p.

An amplifier used on USS CAVALLA as part of the internal-communication system is described in this report. This amplifier is similar in design and construction to that built for USS BREM. The input signal is supplied by two to eight small dynamic speakers connected in parallel. It has sufficient gain and power to drive two to eight small dynamic speakers, also connected in parallel. Push-pull amplifier circuits and two rectifiers were incorporated to provide a safety factor against tube failures. The schematic diagram of the amplifier is included.

P34/R855 671
HAEFNER, S. J. and WESTNEAT, A. S.
Owen-type inductance bridge.
Columbia Univ. - Div. of War
Research
Apr. 7, 1944 6p.

An Owen-type inductance bridge was built by the Electronics Design Group. This bridge is designed to measure the series inductive and resistive components of an unknown impedance with an inductance range from 10 H to 60 mH at frequencies up to 10 kc. The accuracy is of the order of 1 percent. Coils with Q's much less than 1 can be measured easily.

D12/R856 672
HOFF, H. B.
Inspection trip to Block Island
Listening Station.
Columbia Univ. - Div. of War
Research
Apr. 7, 1944 2p.

On March 22, 1944, an inspection of the Block Island Listening Station was made by New London Laboratory personnel. In addition to a routine inventory and inspection of building maintenance items, tests were made of the amplifier equipment and hydrophones.

P43/R857 673
GILLET, G. D.
Night lighting for submarine
periscopes.
Columbia Univ. - Div. of War
Research
Apr. 7, 1944 v.p.

This memorandum discusses changes in night lighting for periscopes if the lubber lines are extended. Recommended is an extension of the lubber lines since the use of them greatly simplifies the operation and maintenance of the device.

G12/R858 674
HARRIS, W. T. and VAN LENNEP, D. W.
A permanent magnet
magnetostriction hydrophone
construction.
Columbia Univ. - Div. of War
Research
Apr. 12, 1944 10p.

The hydrophones described in this memorandum were constructed for the purpose of testing the design. They were found to have good efficiency, a desirable frequency response, and the expected stability against shock from severe depth charging. The construction of the units is described. There are brief paragraphs detailing its application and performance.

G13/R859 675
WESTNEAT, A. S.
Electrical measurements on three hydrophones with the Western Electric W-30156 input transformers. Columbia Univ. - Div. of War Research
Apr. 7, 1944 2p.

The frequency response of three hydrophones was measured in conjunction with the Western Electric W-30156 input transformer. The frequency response of the hydrophone plus the input transformer, for all three cases, is shown on the attached curve.

P34/R860 676
HOFF, H. B.
A graphical chart for combining single-frequency signals with continuous spectra. Columbia Univ. - Div. of War Research
Apr. 7, 1944 3p.

Discussed in this memorandum are problems connected with acoustical measurements and the necessity to ascertain what

increase in level in a filter-band reading, obtained from a continuous spectrum, will be produced by the addition of a single-frequency signal of a given number of dB above the average 1-cycle band spectrum level. Conversely, in many cases, it is desirable to find out how many dB above the average 1-cycle band value a given single-frequency signal must be to produce a given number of dB increase above the level measured in the band. This memorandum gives the graphical chart and an example of its use.

P33/R862 677
GRAHAM, W. F. and MANINGER, R. C.
Comparative field tests of underwater-listening equipment installed on the ELCOBEL. Columbia Univ. - Div. of War Research
Sept. 30, 1944 v.p.

Tests made during October and November, 1943, on the underwater-sound equipments installed on the Bell Telephone Laboratories ship, the ELCOBEL, indicated that the electrically steered sound equipment was comparable with the mechanically steered equipment in most respects and that the use of the PAL (phase actuated locator) was desirable for obtaining accurate bearings. The 9AA array had the greatest bearing accuracy with 70 percent of the bearings obtained with it being in error by less than 0.8 deg for a 0 seastate and less than 1.5 deg for a 1 and 2 seastate. Following the 9AA equipment in order of greatest bearing accuracy were the through-the-hull equipment, the 7A array, the 6-unit array, and the 6C system. Data concerning the limits of useful listening ranges indicated that through-the-hull equipment had only a slightly greater range than the 6-unit, 7A, and 6C equipments on the average, but it had a range twice as great

as that of the 9AA equipment.
Effects of interfering targets on
the PAL and effects of self-noise
of ELCOBEL underway on listening
ranges are shown graphically in the
report.

D46A/R863 678
HOFF, H. B.; COLE, D. L.; and
WAGNER, R. A.

Statistical analysis of Miami
Area Ambient-Noise Survey data.
Columbia Univ. - Div. of War
Research
May 29, 1944 6p.

This memorandum presents the
results of a statistical analysis
of the data taken on the first four
cruises of the Miami Area Ambient-
Noise Survey conducted from June 27
to August 9, 1943. This survey,
which was conducted chiefly in the
waters of the Bahamas and along the
Florida coast, was made aboard USS
SALUDA. A total of 101
measurements are included in the
present statistical analysis.
These data include analyses of
water noise, shrimp noise, ship
noise, croaker noise, unidentified
biological noise, and combinations
thereof. Figures of these
measurements are included.

P44/R865 679
KROENERT, J. T.
Modification of Model 755
receiver.
Columbia Univ. - Div. of War
Research
May 30, 1944 3p.

This report dicusses the
modification of the Submarine
Signal Company Model 755-B (CU
#2186A) amplifier for operation,
from 14-36 kc to 17-52 kc. The
frequency response of the receiver
and the wiring diagram of the input
circuit are included.

D53/R866 680
LOYE, D. P. and RODGER, M. T.
Auxiliary and underway tests on
USS GABILAN (SS-252).
Columbia Univ. - Div. of War
Research
Apr. 10, 1944 6p.

Sound measurements, using a
JP-1 type headphone flexibly
mounted near the regular headphone,
were conducted on January 28, 1944,
of the auxiliaries of USS GABILAN
(SS-252). Following these
measurements, the submarine was
tested at periscope depth underway
at various speeds ranging from
minimum to maximum. The results of
the auxiliary noises are given in
an attached table.

P21/R867 681
KROENERT, J. T.
Memorandum for file.
Columbia Univ. - Div. of War
Research
Apr. 7, 1944 8p.

This memorandum outlines a
procedure to facilitate the testing
of the QFL amplifier chassis.
Drawings are also included.

D50/R858 682
FOLLIN, J. W.
Recommendation for range
measurement for the DCDI.
Columbia Univ. - Div. of War
Research
Apr. 28, 1944 16p.

This report discusses a series
of measurements of explosive shock
waves with the object of
determining the possibility of
measuring the range of a depth
charge from the shock wave
produced. From the results of
these measurements, it is possible
to specify the type of system with
which to measure range, but the
results are not complete enough to
provide a calibration of such a
system. Numerous graphs and photos
are included.

D38/R869 683
HERRNFELD, F. P. and COLE, A. R.
Report on JP installations at
Rockaway Point Coast Guard Station.
Columbia Univ. - Div. of War
Research
Apr. 17, 1944 5p.

This memorandum discusses the inspection of JP (through-the-hull) installations at the Rockaway Point Coast Guard Station. Most of the problems in the 10 patrol craft inspected were discovered in grounding, location of gear, and faulty mechanical installation. Specific information on the servicing of the equipment is outlined.

P35/R870 684
HAEFNER, S. J.
Amplifier and bridge
measurements.
Columbia Univ. - Div. of War
Research
Apr. 28, 1944 19p.

This memorandum describes transmission-gain and insertion-gain formulas with practical methods of measurements on amplifiers. Impedance bridges available for use in the Laboratory are also described, and testing precautions conducive to reliable data are outlined.

P35/R871 685
WESTNEAT, A. S.
Hipersil cores.
Columbia Univ. - Div. of War
Research
Apr. 12, 1944 3p.

Discussed in this memorandum is the investigation of the permeability and flux density of Hipersil core material. To make measurements over a wide range of flux densities, it was necessary to use several methods. Each of these could measure only a certain section of the curve. The attached

curve is the average of the results of all methods. Before each measurement was made, the core was demagnetized.

D49/R872 686
GOURLEY, G. M.
Scatter Charge tests.
Columbia Univ. - Div. of War
Research
Apr. 12, 1944 1p.

On April 1, 1944, tests were conducted on four Scatter Charge clusters fired from the K-gun of USS SC-665. These tests were conducted to check operation of the pistols manufactured by the Globe Tool & Die Company. The units, selected at random, gave satisfactory operation.

D50/R873 687
ROCKWELL, G. O.
Changes in two-conductor cable specifications for DCDI.
Columbia Univ. - Div. of War
Research
Apr. 11, 1944 2p.

Discussions in this memorandum involve changes in two-conductor cable specifications for the depth-charge direction indicator manufactured by the Sickles Co. of Chicapee Falls, MA. The company has agreed to make the necessary alterations to accommodate this cable.

D53/R874 688
LOYE, D. P.; WAGNER, R. A.; and
PRATT, R. W.
Dockside noise measurements of new-construction submarines.
Columbia Univ. - Div. of War
Research
May 10, 1944 v.p.

Difficulty has been encountered in checking and correcting excessive noise from the auxiliary machinery of new submarines because

it has been the practice to carry on this work during the hectic period between commissioning and assignment to patrol duty, a period when maximum effort is being concentrated on training activities. This report covers the accomplishment to date of a study undertaken at the request of the Bureau of Ships to determine the feasibility of carrying on sound measurements while the boat is being fitted out at the dock prior to commissioning. It is too early to present final conclusions, but dockside noise measurements made on six new-construction submarines of three different types show sufficient correlation to those made at a Navy offshore sound range to indicate an excellent likelihood that this proposed plan will prove practical.

G22/R875 689

Index to documents issued by the New London Laboratory September 15, 1941, to August 31, 1943. Columbia Univ. - Div. of War Research N.D. v.p.

This index contains title, author, report number, and date information for documents issued by the New London Laboratory from September 15, 1941, to August 31, 1943.

P32/R876 690

SNOW, W. B. and HOFF, H. B. Cavitation speeds of Fleet-type submarines. Columbia Univ. - Div. of War Research Apr. 19, 1944 6p.

This memorandum discusses measurement recommendations regarding submarine propeller cavitation, which applies to the formation of vortices or cavities in the water surrounding tips of rotating propellers. The high

velocities in these vortices, or the sudden collapse of the cavities due to the pressure of the surrounding water, causes an acoustic shock, or noise, which may greatly increase the sound output from a submarine. In general, there is a critical speed, below which cavitation noise is not produced, but above which it starts suddenly and increases rapidly. For evasion, therefore, it is very desirable to stay below the "cavitation threshold," or speed at which this noise begins to rise rapidly. Noise level and keel-depth graphs are included.

G37/R877 691

Assembly and anchoring instructions for the 5-ft triplane target. Columbia Univ. - Div. of War Research Apr. 17, 1944 v.p.

The 5-ft triplane target has been designed to provide a means for testing echo-ranging equipment and training underwater-sound operators. It is a structure made up of panels and other parts in the shape of three planes bisecting one another at right angles. This report provides instructions for the assembly and anchoring of this unit. Photographs and diagrams are included.

G27/R878 692

VAN LENNEP, D. W. Calibration of four (QB) 733R transducers. Columbia Univ. - Div. of War Research May 1, 1944 v.p.

The New London Laboratory is investigating the possibilities in echo ranging by submarines at higher frequencies than are used at present, particularly in the region of 30 to 45 kc. Four projectors were borrowed from the Submarine

Signal Co. to be calibrated and results of the measurements are indicated. Graphs showing performance characteristics are included.

D34/R879 693
ARCHER, G. W.

Adaptation of R-3/ARR-3 receiver to directional indication. Columbia Univ. - Div. of War Research
N.D. 5p.

This memorandum covers the circuit changes necessary to modify the R-3/ARR-3 receiver for use with the directional buoy. Since the method of alignment of the modified receiver will be different than that of the unmodified receiver, a revised alignment procedure has been included.

P38/R880 694
KITREDGE, C. P.

Compensated pendulum experiments. Columbia Univ. - Div. of War Research
Apr. 18, 1944 10p.

Sea tests of the Mark 53 gun-train indicator and experimental gyroscopes for the Mark 52 gun-train indicator were conducted aboard USS SEMMES on May 31, 1943. Performance characteristics were unsatisfactory, namely, length of life and ability to withstand the shock of gunfire. Therefore, efforts in the development of a stable element to replace the gyroscopes were undertaken. It was decided that overcompensation of the pendulum could be obtained without instability. Thus, an approximately stable element could be obtained by adjustment of the component parts. Diagrams, photos, and drawings are included.

P36/R881

695

Preliminary installation, operation, and maintenance instructions for Model NL-120 echo-Doppler amplifier and Model NL-121 echo-Doppler indicator. Columbia Univ. - Div. of War Research
Apr. 20, 1944 v.p.

The echo-Doppler indicator (EDI) is a device to be used in conjunction with echo-ranging equipment to indicate visibly the range rate of a target in anti-submarine warfare. In echo-ranging systems, the supersonic frequencies transmitted and subsequently received as echoes are converted to audible tones by heterodyning with the output of a local oscillator in the receiver amplifier. The frequency or pitch of the echo will be higher when the attacking vessel is approaching the target and lower when it is receding therefrom. The magnitude of the frequency change is proportional to the rate of change of range, and is known as "Doppler effect." This document outlines the installation, operation, and maintenance instruction of these units. Tables, photos, and drawings are included.

D53/R882

696

MANINGER, R. C. and HARRISON, M.
Tests on the noise-level monitor installed on USS S-48. Columbia Univ. - Div. of War Research
Apr. 18, 1944 5p.

On April 14 and 15, 1944, field tests were made on the noise-level monitor (NLM) installation on USS S-48. Table I shows the results of the tests, corrected for background levels and amplifier gain settings, so that all levels can be compared directly.

G37/R884 697
TATUM, A. K. and SETTERHOLM, V. M.
Modifications of the triplane
target.
Columbia Univ. - Div. of War
Research
Apr. 20, 1944 5p.

Difficulties have been experienced in the construction, handling, and shipping of the triplane target, particularly the large size known as the 6-ft model. A redesign of the target to facilitate construction, make it stronger mechanically, and to allow it to be shipped in knocked-down condition, was decided on. The new target differs in external design from the old model in that the outline of the panels is square rather than octagonal; this permits a reduction in overall dimensions without a corresponding decrease in reflecting area. The new target is 5-ft square, as compared to the 6-ft dimensions of the old model. Photos are included.

P32/R885 698
SNOW, W. B.
Method of self-calibration of gain control on 755 amplifier in WCA-series sonar equipment.
Columbia Univ. - Div. of War
Research
Apr. 12, 1944 8p.

In making field tests of the variations of background noise with speed and relative bearing on WCA-series equipment, it is necessary to use both the output-level meter and the 755 amplifier gain-control dial. The WCA gear can be used as a rough noise-level monitor in the supersonic range for detecting noisy auxiliaries, such as air compressors, and can be used to determine the propeller speed at which cavitation begins. Self-calibration methods are described. Diagrams and graphs are included.

D16/R885 699
SUTER, H.
Type tests on Expendable Radio sono-buoy, 100 preproduction units (AN/CRT-1A prototype).
Columbia Univ. - Div. of War
Research
Apr. 21, 1944 18p.

This memorandum briefly describes certain of the design features of the 100 preproduction units of the AN/CRT-1A type expendable radio sono buoys and the results of a series of tests of these units extending into February, 1944. On the basis of tests made to date, the unit as approved is superior to the AN/CRT-1 model which it supersedes. Photos and drawings are included.

P55/P32/R887 699-1
SNOW, W. B. and HOFF, H. B.
Noise versus speed tests on 755 receiver using QB transducers, SEA LION and CAVALLA.
Columbia Univ. - Div. of War
Research
June 2, 1944 12p.

This memorandum describes the results of tests conducted by Laboratory engineers onboard USS CAVALLA on March 6, 1944, and onboard USS SEA LION on March 14, 1944. These tests were performed on the WCA-2 equipments using the QB projectors. It was concluded that further tests of this nature were desirable on other submarines and over a range of depths.

G27 699-2
SNOW, W. B.
Permoflux headphones.
Columbia Univ. - Div. of War
Research
Apr. 26, 1944 2p.

This memorandum discusses the various models of Permoflux headphones for use with the sono-

buoy. The official sono-buoy headset is called H3/ARR-3, and consists of two Permoflux PDR-8 receivers, with headband, cord, and plug. The Permoflux number for this assembly is DHS-12.

D53/R888 699-3
NUNAN, J. K.

Supplement to an interim statement on the noise-level monitor (NLM).
Columbia Univ. - Div. of War Research
Apr. 20, 1944 2p.

This memorandum is a supplement to D53/R846. The results of the NLM tests on USS S-48 on April 14 and 15, 1944, verified the original contention that a submarine's noise could be monitored by the installation of a number of hydrophones appropriately placed externally to the boat's pressure hull. A drawing is included.

G12/R889 699-4
HARRIS, W. T.; EDWARDS, P. B.; and
VAN LENNEP, D. W.

Midget-element magnetostriction hydrophones.
Columbia Univ. - Div. of War Research
May 23, 1944 v.p.

This memorandum contains data on hydrophones of the following serial numbers: H-72, H-73, H-90, H-91, H-92, H-94, H-98, and H-116. The hydrophone construction presented possesses advantages over present types of line hydrophone construction (JP-1, or 36- by 2- by 0.035-in. one or two-piece toroidally wound plastic-covered construction). Drawings and photos are included.

P33/R890
TATUM, A. K.

699-5

Notes on preliminary measurements of aircraft noise.
Columbia Univ. - Div. of War Research
June 9, 1944 2p.

Two tests were conducted to determine the spectrum and levels of patrol-aircraft noises that might be received at the water surface or underwater. One test used a PBY and the other a PV-1. There are not enough data available from these tests to make definite conclusions as to final detection methods, though it is apparent that the possibilities of detection are far greater with the hydrophone in air than in water. A more detailed analysis of the data, giving spectrum distribution and absolute levels on these tests, is being prepared and should be available soon.

P28/R891
MARKHAM, J. J.

699-6

Range error due to thermal gradients in triangulation from a submarine.
Columbia Univ. - Div. of War Research
July 6, 1944 18p.

This memorandum discusses range error and calculations that can be made to determine it. Figures are attached showing temperature versus depth.

D24/R892

700

COLE, A. R.

Completion of NL-118A
supersonic converter.
Columbia Univ. - Div. of War
Research
June 13, 1944 v.p.

The Electronics Design Group
has developed the NL-118A
supersonic converter as an improved
version of the NL-115. The major
changes incorporated in this new
design include (1) better layout,
leading to greater serviceability;
(2) reduction of the number of
types of vacuum tubes from three to
one; (3) possibility of
remagnetization of the hydrophone
without removing it from its
listening circuit; (4) decreasing
the frequency range down to 8 kc;
and (5) greater signal-to-noise
ratio. Numerous curves, photos,
and drawings are included.

P32/R893

701

SNOW, W. B.; HOFF, H. B.; and
MARKHAM, J. J.

Self-noise measurements on JP-1
sound-receiving equipment of the
USS SEA LION.
Columbia Univ. - Div. of War
Research.
June 5, 1944 16p.

This memorandum describes the
results of self-noise measurements
on the JP-1 equipment of USS SEA
LION conducted on April 14, 1944,
by engineers from the New London
Laboratory. All the measurements
reported herein were made at
periscope depth. Numerous curves
are included.

D53/R895

702

LOYE, D. P. and PRATT, R. W.

Noise and vibration
measurements of dc-ac motor-
generator sets.
Columbia Univ. - Div. of War
Research
May 15, 1944 6p.

This memorandum discusses noise
and vibration measurements that
were made of dc-ac motor-generator
sets on USS BARBEL (SS-316) and USS
BARBERO (SS-317). These motor
generators replace, on the latest
new-construction submarines, the
lighting and IC motor generators of
other new-construction submarines.
Results are shown on the attached
figures.

P32/R896

703

LOYE, D. P.; HOFF, H. B.; and
BERRY, A. M.

Analysis of propeller-noise
measurements on USS BALAO.
Columbia Univ. - Div. of War
Research Aug. 14, 1944 21p.

This memorandum contains a
reevaluation of measurements
conducted by engineers from the New
London Laboratory on board USS
BALAO on April 27, 1943. The
measurements presented in this
memoandum are data on a spectrum-
level or 1-cps-band basis to
facilitate comparisons with other
submarine-noise measurements.
Diagrams and curves are included.

P33/R897

704

GERJUOY, E.

Airplane detection by submarine.
Columbia Univ. - Div. of War
Research
May 10, 1944 13p.

This report discusses
computations on the possibility of
detection of an airplane by a
submerged submarine using its JP-1,
or some other, acoustic gear. The
results of these computations are
reported herein. Diagrams and
curves are included.

D16/R898

705

BARKSON, J. A.

AN/CRT-1A parachute pack
trouble and redesign.
Columbia Univ. - Div. of War
Research
May 5, 1944 4p.

This memorandum briefly
summarizes the status of various
drop and wind-tunnel tests made of
the parachute and parachute pack of
the AN/CRT-1A unit. The
conclusions of this laboratory,
with respect to further tests and
ultimate redesign of the parachute
pack, are also summarized.
Conclusions indicated that, unless
further evidence of trouble is
encountered, the present parachute
pack can be considered satisfactory
for the existing AN/CRT-1A
contracts now in process.

D55/R899

706

SAWYER, C. R.

Survey of American Type
Founders, Inc., and the
Phil-American Company.
Columbia Univ. - Div. of War
Research
Apr. 29, 1944 5p.

This report discusses a survey
conducted to determine whether
American Type Founders, Inc., is a
suitable manufacturer for five
pilot models of the RLI system.
Many companies were surveyed and
results of these studies are
documented. No conclusions were
drawn for application in this
project.

D53/R900

707

KNUDSON, W. T.

Equipment setup and grounding
used for submarine-noise
measurement.
Columbia Univ. - Div. of War
Research
May 1, 1944 3p.

This memorandum is written as
an aid in setting up the equipment
used for submarine-noise
measurements. Discussed are the
topics of grounding, noise-analyses
setup, overall measurements, and
noise analyses. A schematic
diagram is included.

D16/R907

708

SUTER, H.

ERSB drop tests from the bomb
bay.
Columbia Univ. - Div. of War
Research
May 8, 1944 10p.

This memorandum discusses the
results of buoy drop tests made
from a TBF bomb bay during the
period April 8 to 15, 1944. In
these tests, it was indicated that
the detonator of the Mark I Mod I
markers must be operated if a
satisfactory slick is to be
produced. Test procedures used to
produce this slick are outlined.
Tables and photos are included.

P36/R908

709

Revised preliminary
installation, operation, and
maintenance instructions for Model
NL-121 echo-Doppler indicator and
Model NL-120 echo-Doppler amplifier.
Columbia Univ. - Div. of War
Research
May 12, 1944 v.p.

This manual contains complete
information on the echo-Doppler
indicator, a device to be used in
conjunction with echo-ranging
equipment to indicate visibly the
range rate of a target in
subsurface warfare. The amplifier
is designed to amplify frequencies
between 600 and 1300 cps in such a
manner as to compensate for the
nonlinear response of the frequency
meter and produce uniform
indications throughout its
frequency range. Numerous tables,
photos, and drawings are included.

D50/R910

710

HAEFNER, S. J.

Experimental model of depth charge range meter II.
Columbia Univ. - Div. of War Research
May 8, 1944 3p.

This report discusses an experimental depth-charge range meter that is intended to be peak sensitive to the pulse transmitted by a blastphone. A test shows that, with the input potentiometer set for maximum amplification, a maximum undistorted steady-state peak-output voltage of 128 is obtained across the 4000-ohm diode load with a peak-input voltage of 1.16 or nearly 41 dB of voltage amplification. A drawing is included.

D34/R911

711

ARCHER, G. W.

DRSB voltmeter comparison test.
Columbia Univ. - Div. of War Research
May 4, 1944 4p.

This memorandum covers a comparison test of the performance of two electronic voltmeters that were designed for use in the DRSB receiver; one of the voltmeters is being used at present and the other is an improved type. The test was made to determine which of the two would be the more stable from the standpoint of power supply variation. The results of these comparison tests are given in the accompanying table. A diagram of the improved voltmeter is included.

D16/R912

712

Preliminary handbook of maintenance instructions for Radio Transmitting Equipment AN/CRT-1A.
Columbia Univ. - Div. of War Research
May 12, 1944 v.p.

Complete operating and maintenance instructions for the AN/CRT-1A radio transmitting equipment are outlined in this manual. This unit is a self-contained miniature broadcasting station, in the form of a buoy, whose function is to broadcast by radio the underwater sounds made by a submarine. The buoy is launched from suitably equipped aircraft into water where it can detect the sounds of a submarine, thus aiding in a more effective submarine search and attack. Numerous photos, diagrams, tables, and drawings are included.

G11/R913

713

Report on training equipment for submarine personnel.
Columbia Univ. - Div. of War Research
May 6, 1944 v.p.

This manual was developed for use in the training of submarine personnel. Included in the equipment discussed are (1) Mark VIII torpedo angle solver demonstrator, (2) Mark I conning officer attack teacher, (3) periscope range estimation trainer, (4) sound injector training aid for sonar gear, (5) activated bearing indicator trainer, (6) relative bearing drill slide, (7) IS-WAS slide demonstrator, (8) sound slidefilms, and (9) JP-1, Series B phonograph records. Photos are included.

G12/R914

714

VAN LENNEP, D. W.

Calibration of a GBL-2 crystal hydrophone.
Columbia Univ. - Div. of War Research
May 10, 1944 8p.

This memorandum discusses GB 1-2 hydrophone calibrations on BARGE. The purpose of the measurements was to select the two adjacent quarters that were most

nearly matched and to measure the response and directional characteristics of these two quarters. Directional characteristics at 24 kc of the individual quarters selected are shown on the attached figures. Also included are figures indicating the directional characteristics at 24 kc of the two quarters connected series-aiding and series-opposing, respectively.

G12/R915 715
 VAN LENNEP, D. W.
 Tests on two plastic-covered 3-ft straight toroidally wound hydrophones.
 Columbia Univ. - Div. of War Research
 May 12, 1944 9p.

This memorandum discusses the results of tests on two plastic-covered 3-ft straight toroidally wound hydrophones. The results are shown on the attached figures.

D55/R916 716
 ARNDT, W. F.
 Survey of the Dictaphone Corporation.
 Columbia Univ. - Div. of War Research
 May 9, 1944 4p.

The investigation of the Dictaphone Corp. was made for the purpose of determining whether this firm is a suitable manufacturer for five pilot models of the RLI system. It was determined that this firm is capable of performing the job if extensive engineering is not required.

P35/R917 717
 WESTNEAT, A. S.
 Characteristics of Mazda lamps.
 Columbia Univ. - Div. of War Research
 May 8, 1944 5p.

The Electronics Group has investigated standard Mazda lamps for possible use as ballast tubes. The values of current through the lamps were observed for various applied voltages, and 60-cycle resistances were computed from these values. No conclusions have been drawn from this investigation. The attached curves of voltage and resistance versus current are submitted as data only.

G10/R918 718
 GERJUOY, E.
 Torpedo acoustically controlled by submarine.
 Columbia Univ. - Div. of War Research
 May 18, 1944 3p.

The acoustically controlled torpedo, developed for use by submarines, would be controlled by a signal sent out by the submarine and received by a hydrophone or hydrophones in the torpedo. The torpedo would be so controlled by the submarine that the torpedo and target always remain at the same bearing. Control by means of a modulated supersonic carrier, and a discussion of the advantages and disadvantages inherent in such a device, are also outlined in this memorandum.

P50/R919 720
 Training program for operators and maintenance men of JP-1 sound-receiving equipment.
 Columbia Univ. - Div. of War Research
 N.D. v.p.

The JP-1 training program consists of operation and maintenance courses, necessary training aids, and information to instructors trained for introduction of the program to the Navy. A number of written and

practical tests are also given to determine the background of the men being trained, as well as the effectiveness of the training course.

D16/R920 721
BARKSON, J. A.
Expendable radio sono-buoy 12-frequency system designation scheme. Columbia Univ. - Div. of War Research
May 16, 1944 13p.

This report discusses two possible frequency-designation schemes with the factors involved, for the proposed 12-frequency expendable radio sono-buoy system under consideration. One scheme uses alphabetically designated frequency bands, A to L. The other scheme utilizes the present 6-color arrangement and a second set of the same colors in a "white-band" portion of the dial, as contrasted to the present "black-band" portion of the dial. This "white-and-black band" arrangement is recommended for trial purposes. Photos and diagrams are included in this report.

D24/R921 722
Specification for NL-119 interphone set, Model I. Columbia Univ. - Div. of War Research
June 2, 1944 44p.

The detailed structural, electrical, and performance requirements contained in this report are intended to cover the requirements for the proper construction of NL-119 interphone set, Model I. General specifications for inspection of material, subspecifications, drawings, and the basic equipment specifications issued by the Navy Department are attached.

G42/R924 723
SNOW, W. B.
Equipment for selection of submarine-sound operators. Columbia Univ. - Div. of War Research
May 13, 1944 4p.

This memorandum discusses electronic equipment that will be used in studying methods of selecting personnel to be trained as submarine-sonar operators. Its function will be to test the suitability of such personnel by measuring the minimum detectable level of a noise sounding like propeller beats in the presence of a steady background noise. The background noise will be similar to water noise on a quiet day, as heard over the JP-1 gear.

G12/R925 724
GERJUOY, E.
Performance of directional radio sono buoy hydrophone in series with a BTL 2-in. spherical (cardioid response) hydrophone. Columbia Univ. - Div. of War Research
May 13, 1944 8p.

This memorandum discusses the possibility of improving the performance of the directional radio sono-buoy hydrophone by using it in conjunction with some other hydrophone with superior performance at low frequencies. Accompanying this report are curves indicating performance and a photo of one combination which has been tried.

D53/R926 725
LOYE, D. P. and WAGNER, R. A.
Manitowoc dockside auxiliary noise measurements, USS HARDHEAD (SS-365) Columbia Univ. - Div. of War Research
May 13, 1944 4p.

This report discusses measurements that were made near the Manitowoc Co. docks. Two sets of measurements were taken and both were corrected for background noise. Table I, attached, indicates results for the following: (1) dockside measurements, hydrophone overside; (2) preliminary conversion factors, overside to Navy sound range; (3) calculated Navy sound range measurements; (4) Navy sound-range upper limits; and (5) dockside measurements, hydrophone 200 ft abeam.

G12/R928 726
 THURAS, A. L. and FOLLIN, J. W.
 Effect of annealing on the magnetic properties of nickel tubing.
 Columbia Univ. - Div. of War Research
 May 16, 1944 10p.

This report discusses a series of measurements that were made to determine the variation of magnetic and magnetostriction properties of nickel as a function of the degree of annealing (represented by the annealing temperature) of the nickel tube. These measurements were carried out on two types of nickel, ordinary cold-drawn tubing and electrodeposited nickel tubes. Conclusions indicated that commercial drawn-nickel tubing be annealed at 1200°F for 1/2 hr. in order to get the most uniform product and most sensitive hydrophones.

G12/R929 727
 HARRIS, W. T. and VAN LENNEP, D. W.
 Hydrophone H-115.
 Columbia Univ. - Div. of War Research
 May 19, 1944 11p.

The hydrophone discussed here is one of a group of nine constructed in the Laboratory for BUI applications. This particular

hydrophone is to be sent to Bell Laboratories for experimental use. Figures are attached indicating comparison characteristics.

D50/R930 728
 FOLLIN, J. W.
 Permanent-magnet blastphones.
 Columbia Univ. - Div. of War Research
 May 15, 1944 3p.

This report discusses tests that were made to determine whether any differences in response in magnetostrictive hydrophones were obtained with different permanent-magnet materials as core elements. The tests were made on the permanent-magnet blastphones A-41 and A-49. Conclusions indicated that the best choice would be to use Vicalloy as core material, if the coercive force can be improved, because of its better low-frequency response and its machinability. Curves are attached outlining performance characteristics.

D24/R931 729
 HAEFNER, S. J.
 Experimental spectrum scanner, Model I.
 Columbia Univ. - Div. of War Research
 May 24, 1944 9p.

This memorandum discusses an experimental model of a spectrum scanner that indicates in the panoramic fashion of an oscilloscope signals of frequencies from 10 to 70 kc. Accompanying figures indicate various scanner characteristics.

P48/R932 730
 GILLET, G. D.
 Sound-injector alterations.
 Columbia Univ. - Div. of War Research
 May 17, 1944 2p.

Discussed in this memorandum is the sound injector used as a training aid for the purpose of simulating ship-propeller sounds, water noise, and sonar operations. This unit requires considerable alteration before it can be used effectively. Outlined in this report are steps to be followed to make these changes.

D54/R933 731
PROUDFOOT, D. A. and TEAL, E. E.

Comparison of 7- and 44-Mc internal-communication systems.
Columbia Univ. - Div. of War Research
May 20, 1944 4p.

The purpose of this series of tests was (1) to compare the performance of the 7- and 44-Mc systems, and (2) to gain additional information concerning the performance of the 1- and 7-Mc systems under operating conditions. The results are outlined and are based entirely on a comparison of the standard 7-Mc system with the 44-Mc system, and do not take into account changes to the 7-Mc system, other than minor adjustments such as speaker locations.

P48/R934 732
GILLET, G. D.

Filter requirements to simulate hydrophone beam patterns with the sound injector.
Columbia Univ. - Div. of War Research
May 23, 1944 3p.

This report discusses hydrophone directionality that can be practically simulated, for use with the sound injector on training devices. The requirements for a specific application seem to be adequately satisfied by simulating hydrophone beam patterns at

frequencies of 1 kc, 4 kc, and 7 kc. Desired filter characteristics are included on an attached graph.

P36/R935 733

Specification for Model NL-120 amplifier for echo-Doppler indicator.
Columbia Univ. - Div. of War Research
May 24, 1944 22p.

This specification covers the manufacturing requirements for a Model NL-120 echo-Doppler amplifier to be used with a Model NL-121 vibrating-reed indicator unit, supplied by another manufacturer. Included are tables, drawings, and photos.

P47/R936 734

Instructor's pamphlet for the relative bearing-animater trainer.
Columbia Univ. - Div. of War Research
July 1, 1944 8p.

This is a brief instructor's pamphlet explaining the use of the relative bearing-animater trainer (a lantern slide with movable dials). Diagrams are included.

P47/R937 735

Instructor's pamphlet for the bearing-indicator animater trainer.
Columbia Univ. - Div. of War Research
July 1, 1944 17p.

This instructor's pamphlet explains the purpose of the bearing-indicator animater trainer, a small device that can be slipped into a lantern-slide projector to project images of the parts of the bearing indicator on a screen.

D55/R939 736
ARNDT, W. F.
Report on a conference with the
General Electric Company.
Columbia Univ. - Div. of War
Research
May 26, 1944 2p.

The conference discussed the construction of five pilot models of the D55 submarine-sonar modification equipment. The models would not necessarily meet all Navy specifications, but would be built to CUDWR drawings and specifications.

55/R940 737
ARNDT, W. F.
Conference with Wallace and Tiernan Products, Inc.
Columbia Univ. - Div. of War
Research
May 18, 1944 1p.

This conference was held to discuss the construction of five pilot models of the D55 submarine-sonar modification equipment by Wallace and Tiernan Products, Inc. CUDWR expects to be contacted regarding whether the company will accept the proposals.

D24/R941 738
GONGWER, C. A.
Observations of installation of JP-1 shafts and gear boxes.
Columbia Univ. - Div. of War
Research
May 26, 1944 4p.

This memorandum discusses JP-1 installations in submarines that may be unsatisfactory because of the high and variable torque on the training handwheels. This causes the operator excessive fatigue. For the installation of power training, it was decided to install a new gear box and shaft to reduce the backlash and improve the torque characteristic.

G21/R942 739
HARRIS, W. T.
Plastics for insulating and protecting instruments from water or humidity.
Columbia Univ. - Div. of War
Research
May 27, 1944 2p.

This paper presents a brief discussion of plastic coatings suitable for insulating electrical or acoustic apparatus from water or high humidity, and especially for insulating instruments that must be immersed in sea water.

D16/D34/R943 740
Course outlines, training program for operators and maintenance men, ERSB-DRSB equipment.
Columbia Univ. - Div. of War
Research
May 27, 1944 v.p.

This manual contains detailed outlines of courses for ERSB and DRSB training equipment.

D55/R944 741
Preliminary installation instructions for intercompartmental cabling system for D55 submarine-sonar equipment modification.
Columbia Univ. - Div. of War
Research
June 2, 1944 3p.

These preliminary instructions cover the material requirements and installation procedures for an intercompartmental cabling system between the conning tower and the forward torpedo room of Fleet-type submarines which is required when the D55 submarine sonar equipment modification units are to be installed.

P52/R945

742

GILLET, G. D.

Recorded water noise for directional radio sono buoy trainer. Columbia Univ. - Div. of War Research
May 29, 1944 2p.

This memorandum discusses a device to produce the sounds corresponding to actual water noise. Various schemes were proposed to simulate these sounds by electronic and mechanical means; however, on the basis of fidelity, ease of construction, and time limitations, a recorded source of water noise seems to be the most desirable.

P32/R946

743

SNOW, W. B. and HOFF, H. B.

Self-noise measurements on USS GABILAN and USS BARBERO JP-1 sound-receiving equipment. Columbia Univ. - Div. of War Research
July 18, 1944 v.p.

This memorandum describes the results of self-noise measurements on the JP-1 equipments of USS GABILAN and USS BARBERO. Included is a table indicating estimated range-reduction factors for various speeds. Also attached are numerous frequency curves and diagrams of measuring circuits.

G12/R947

744

FOLLIN, J. W.

Elimination of side-lobe interference in the RLI: Part I, Theoretic Columbia Univ. - Div. of War Research
June 8, 1944 v.p.

This report discusses the reduction of interference in the RLI system. To accomplish this, it is necessary to reduce the

magnitude of the side lobes in the hydrophone and to improve the baffle, thereby reducing the back response and the interference arising therefrom. It was decided to reduce the side lobes on the sum channel because it is the normal-listening channel. Numerous frequency curves are attached.

D24/R948

745

GONGWER, C. A.

Brief study of the structural suitability of the JP-1 mount for carrying a larger hydrophone-baffle assembly. Columbia Univ. - Div. of War Research
June 9, 1944 5p.

This report discusses the substitution of a new design of streamlined 5-ft baffle and hydrophone for the standard 3-ft model. Questions arose, such as direct water drag, strength of baffle-mounting bolts, overturning support, and torsional-shaft deflection. The conclusions involved alleviating these problems.

P33/R949

746

MANINGER, R. C.

Comparative tests on 3-, 4-, and 5-ft hydrophones. Columbia Univ. - Div. of War Research
June 12, 1944 12p.

This report discusses the relative maximum listening ranges and bearing accuracies of 3-, 4-, and 5-ft magnetostrictive hydrophones. Measurements of self-noise at 2-, 4-, and 6-knot speeds and periscope depth were also made. It was found that noise from the superstructure of the submarine underway was an important factor in limiting listening ranges and it was possible to reduce this noise by a few simple operations. Greater improvements could be

attained if this problem were thoroughly investigated. Attached is a diagram of the hydrophone and frequency curves.

P58/R950 747

Outline of sonar instructor's course to be conducted by CUDWR at New London, 12 June to - 8 July 1944.

Columbia Univ. - Div. of War Research
June 1, 1944 v.p.

This outline covers the day-to-day procedures for maintenance and operation instructors of sonar equipment.

D21/R951 748

RHEA, D. O.

Test of British markers, marine, aircraft.
Columbia Univ. - Div. of War Research
June 5, 1944 2p.

This memorandum concerns the possible use of British Marker, Marine, Aircraft, Mk T-III, with the expendable radio sono buoy. Results indicated, however, that, although these markers function well, they are unsuited to the ERSB's uses because of their size, weight, and method of preparation for launching.

G27/R952 749

JONES, M. B. and SNOW, W. B.
Headphone comparison tests.
Columbia Univ. - Div. of War Research
June 1, 1944 12p.

This memorandum gives the results of listening tests made on two Permoflux headphones selected at random. The results substantiate the findings of similar previous tests, and it is

concluded that the Permoflex Model DHS-12 or Navy H-3/ARK-3 headsets, which are made up of Permoflux PDR-8 headphones and appropriate headbands and cords, are suitable for general-listening applications where high fidelity is required. Numerous frequency curves are attached.

D56/R953 750
REYNOLDS, A. T.

Voice frequency amplifier for underwater telephony.
Columbia Univ. - Div. of War Research
June 1, 1944 3p.

The Electronics Design Group was requested to develop an audio amplifier having the following characteristics: (1) power gain greater than 60 dB, (2) power output of 300 W with not more than 10 percent total harmonic distortion at 1000 cps, and (3) frequency response of 500 to 5000 cps, +3 dB. Blueprints of the designs are attached.

P37 751
SNOW, W. B.

Brush Development Company's magnetic tape recording.
Columbia Univ. - Div. of War Research
June 3, 1944 2p.

The Brush Development Company's magnetic tape recording work was documented in a group of five reports and this memorandum outlines the problems and procedures followed.

P40/P52/R955 752
GILLET, G. D.

Synchro requirements for attack teachers, etc.
Columbia Univ. - Div. of War Research
June 7, 1944 2p.

This report tabulates the quantities of the various types of synchros required to complete the sound-injector units of the first attack teacher now scheduled for installation at the U. S. Submarine Base, New London. The total requirements for each type are shown, together with the number now available and, finally, the number that have been covered by requisition to the Purchasing Department as of this date.

P48/R956 753
GILLET, G. D.
Schedule for sound-injector training aid.
Columbia Univ. - Div. of War Research
June 7, 1944 2p.

This memorandum discusses the number of propeller-noise generators and echo-pulse generators necessary for the sound injector training aid. The schedule indicates that these two generators be built as separate units designed to be operated together as required.

D50/R957 754
HERRNFELD, F. P.
Test of BP line filter.
Columbia Univ. - Div. of War Research
June 10, 1944 2p.

This report discusses the attenuation characteristics of a sample line filter of the F. W. Sickles Co., labelled BP line filter. These characteristics and the test setup are shown on attached fig. 1.

D55/R958 755
HERRNFELD, F. P.
Input transformer for RLI.
Columbia Univ. - Div. of War Research
June 12, 1944 3p.

Four samples of an input transformer were developed for the RLI unit. The manufacturing specifications are shown on drawings nos. 16712BE, 16731AE-A, 13145A, 1326A, 16714AE, and 16715AE (not attached). The electrical specifications are indicated and frequency responses and diagrams are attached.

G12/R959 756
REYNOLDS, A. T.
Amplifier for AX-120 hydrophone.
Columbia Univ. - Div. of War Research
June 13, 1944 3p.

The Electronics Design Group was requested to develop an amplifier to be used with a Brush Development Co. AX-120 hydrophone. The design requirements were that the hydrophone and amplifier should be identical in electrical characteristics with the AX-58A hydrophone and amplifier, when used in conjunction with the OAY sound-level meter. Drawing No. 16711-BE is attached.

A30/R961 757
Specification for Speed Halving Unit, Mk I Mod 0.
Columbia Univ. - Div. of War Research
N.D. 10p.

This specification covers the manufacturing requirements for a Speed Halving Unit, Mk I Mod 0. This unit consists of a 5F and a 5G synchro clamped in a supporting frame and geared 2 to 1. This assembly is mounted in a steel box, together with a terminal strip and externally operable switches for selecting speed and for synchronizing.

D55/R962 758
Preliminary master
specification for the D55 sonar
system.
Columbia Univ. - Div. of War
Research
July 13, 1944 13p.

This master specification
furnishes a general description of
the D55 sonar system and covers
specifically (1) the overall
assembly and interconnection of the
major components of the complete
system, (2) the overall operating
performance requirements of the
complete system, and (3) the
construction and performance of the
control unit. The D55 sonar system
consists essentially of
modifications and additions to JP-1
sound receiving equipment.

D55/R963 759
Preliminary specifications for
NL-118A supersonic converter
amplifier of the D55 sonar system.
Columbia Univ. - Div. of War
Research
July 14, 1944 v.p.

This specification covers the
mechanical, electrical, and
performance requirements of the
NL-118A supersonic converter
amplifier. The amplifier is
designed to operate from the
standard JP-1 hydrophone, or its
equivalent. Numerous curves and
drawings are included.

D55/R965 760
Preliminary specification for
the NL-122A sound-absorbing coupler
of the D55 sonar system.
Columbia Univ. - Div. of War
Research
July 12, 1944 16p.

This specification covers the
manufacturing and performance
requirements for the NL-122A sound-
absorbing coupler, which is

installed between the JP-1 training
shaft and the hydrophone for the
purpose of absorbing mechanical
vibration. Numerous curves and
drawings are included.

D55/R966 761
Preliminary specification for
the NL-124 hydrophone of the D55
sonar system.
Columbia Univ. - Div. of War
Research
July 21, 1944 13p.

This specification covers the
mechanical, electrical, and
performance requirements for the
NL-124 hydrophone. This hydrophone
is a component of the D55 sonar
system and is intended to be used
in conjunction with the NL-129
hydrophone baffle. Included in
this report are numerous tables,
curves, and drawings.

D55/R967 762
Preliminary specification for
the NL-125 power training system
(for 313-class submarines) of the
D55 sonar system.
Columbia Univ. - Div. of War
Research
July 3, 1944 v.p.

This specification covers the
construction and performance
requirements of the NL-125 power
training system, and refers
specifically to the power training
systems of the two initial complete
D55 sonar systems to be built by a
selected Bureau of Ships contractor
on the basis of drawings,
specifications, and parts lists
furnished by Columbia University
Division of War Research. Numerous
drawings, parts lists, and curves
are attached.

D55/R970 763

Preliminary specification for the NL-126 right-left indicator system of the D55 sonar system. Columbia Univ. - Div. of War Research
July 13, 1944 v.p.

This specification covers the mechanical, electrical, and performance requirements for the NL-126 right-left indicator system. This system furnishes a direct visual indication of JP-1 hydrophone bearing as being "on target" or requiring right or left training. The RLI translates the signals from the two halves of a symmetrically "split" magnetostrictive hydrophone (the NL-124 hydrophone) into indications of hydrophone bearing. Numerous drawings and curves are included.

D55/R971 764

Preliminary specification for NL-127 bearing-repeater system. Columbia Univ. - Div. of War Research
July 12, 1944 7p.

This specification covers the mechanical, electrical, and installation requirements of the NL-127 bearing-repeater system. This unit is designed to repeat the relative bearing of the RLI-JP-1 hydrophone to the target designator system selector switch of the QB and QC-JK equipments in the conning tower, and to the control unit (chassis D) of the D55 sonar system. Numerous drawings and a parts list are included.

D55/R972 765

Preliminary specification for the NL-127 hydrophone baffle of the D55 sonar system. Columbia Univ. - Div. of War Research
July 8, 1944 7p.

This specification covers the mechanical and performance requirements of the NL-129 hydrophone baffle. This unit is designed for use in conjunction with the NL-124 hydrophone as a complete hydrophone and baffle assembly for the D55 sonar system. Included are numerous drawings and parts lists.

P33/R973 766
MANINGER, R. C.

Analysis of Fleet-type submarine submergence data. Columbia Univ. - Div. of War Research
June 22, 1944 10p.

This memorandum discusses the problem of specifying the position at which dives should be started so that the entire diving operation would be close enough to the measuring hydrophone to enable sound levels to be measured easily. To solve the problem, it was necessary to know (1) the rate and period of deceleration in going from one surface speed to another submerged speed, and (2) rate of submergence. Typical rates and periods of deceleration are shown in table I. Table II shows the results of the analysis of these data. Table III gives the expected values taken as indicated in time (s), range (yd), and region of depth (ft). Figure 1 shows the path of a submarine during a dive and graphs of the acquired data are included.

D51/R974 767
GERJOY, E.

Theoretical formulae for some bearing-deviation indicator systems. Columbia Univ. - Div. of War Research
Aug. 9, 1944 v.p.

This memorandum proposes to record the derivations of formulae obtained by the writer for application to the analysis of BDI systems. Following this derivation, the effect on bearing accuracy of two types of perturbations are generally considered. Included are the effect of an interfering signal present in the water at the same time as the desired target signal and the effect of unbalances in various components of the electrical circuits. Diagrams of the system are attached.

D16/R976 768
SUTER, H.

Type tests, first Freed production AN/CRT-1A ERSB. Columbia Univ. - Div. of War Research
June 19, 1944 7p.

This memorandum briefly describes the results of type tests performed on the first 12 AN/CRT-1A Freed production expendable radio sono buoys. These were tested for audio-frequency response and relative RF output, and were inspected for possible mechanical faults. Conclusions indicated that these units were satisfactory production models.

P20/R977 769
TEAL, E. E. and SNOW, W. B.

Status of MVP listening equipment on USS YP-252. Columbia Univ. - Div. of War Research
July 11, 1944 7p.

As a result of a conference concerning torpedo-detection equipment for merchant vessels, it was decided to build an automatically rotated listening gear for installation on USS YP-252. While the system was in operation, demonstrations were

given of its usefulness in indicating the presence and approximate bearings of multiple targets. In this case, submarines and ships in the Thames River opposite the Laboratory were used as targets, and the observers, in general, agreed that the combination of listening and visual indications offered attractive possibilities.

A30/R978 770

Preliminary operation and maintenance instructions, Speed Halving Unit Mk I, Mod 0 for torpedo data computers, Mark 3. Columbia Univ. - Div. of War Research
July 11, 1944 v.p.

This instruction manual discusses the operating procedures for the speed halving unit, which provides, when desired, a means for doubling the effective tracking range of the torpedo data computer (TDC) on submarines. It is an interim device to be supplied pending the completion of a section to be added to the TDC unit for the purpose. This manual includes a parts list, a list of manufacturers, photos, and diagrams.

D51/R979 771
REYNOLDS, A. T.

Noise generator for RLI alignment. Columbia Univ. - Div. of War Research
June 26, 1944 5p.

The Electronics Design Group has developed and built a noise generator to drive an underwater transducer of the magnetostrictive type for measuring purposes. The generator has a hydrophone polarization current of 0.6 A dc through 7 ohms resistance and a power drain of 160 W at 115 V, 60 cps. Graphs and a drawing are included.

P35/R980
CHIPMAN, L. E.

772

Conversion gain of various tubes operating as mixers. Columbia Univ. - Div. of War Research
June 22, 1944 v.p.

This report presents the results of tests made on several tubes most often used in the Laboratory as mixers for frequency-conversion circuits. The tests determined the relative conversion gain obtainable from the various types of tubes operating under different conditions of grid bias and local-oscillator voltage. The actual frequencies used for all tests were 40-kc signal voltage, 129-kc oscillator voltage, and 89-kc intermediate frequency. Graphs are included.

D28/R981

773

Depth-charge intervalometer. Columbia Univ. - Div. of War Research
June 29, 1944 18p.

The depth-charge intervalometer is an electronically operated timing mechanism for releasing depth charges and firing depth-charge projectors. It will automatically lay a complete depth-charge pattern corrected for range rate. The operator readies the necessary switches and manually inserts range rate up to time to fire. This manual contains a description and preliminary instructions for use of the intervalometer. Photos and drawings are included.

P47/R982

774

Specification for Bearing Indicator Animated Trainer, Mk I Mod 2. Columbia Univ. - Div. of War Research
N.D. v.p.

This specification covers the manufacturing requirements for Bearing Indicator Animated Trainer, Mk I Mod 2. This trainer is a device for use in a slide projector to project an image of a bearing indicator on a screen for instruction purposes. It is so constructed that the images of the two inner dials can be rotated with respect to each other and to the image of an outer fixed dial in a manner similar to the rotation of the dials of an actual bearing indicator. The image is produced by three concentric dials made of transparent plastic and having markings duplicating those on the dials of a bearing indicator.

G13/R983

775

FOLLIN, J. W.
Underwater loudspeaker A-63. Columbia Univ. - Div. of War Research
June 22, 1944 6p.

The Underwater loudspeaker, A-63, consists of three concentric cylindrical laminations 18-in. long and 9.5 in. in diameter, made of nickel 0.015-in. thick annealed at 1500°F. for 1/2 hr. The efficiency drops off very rapidly below 1 kc and little useful output will be obtained below this. Graphs are included.

P35/R984

776

HAEFNER, S. J.
Filter design formulas and charts, Part I. Columbia Univ. - Div. of War Research
July 11, 1944 v.p.

Design formulas and charts are provided for constant K- and M-derived low pass and high pass filters. Formulas and qualitative characteristics are tabulated for several types of full-section and

composite filters. A set of tests and charts is included. Some of the topics considered in this section are (1) transfer loss for full-section constant K- and M-derived low pass and high pass filters, and (2) maximum attenuation for M-derived full section.

D28/R985 777

Manufacturing specifications for depth-charge intervalometer. Columbia Univ. - Div. of War Research
June 23, 1944 v.p.

This specification, together with the associated drawings, covers the manufacturing requirements for the depth-charge intervalometer. The intervalometer consists of an electrically operated timing circuit, a distribution circuit, and a power-control circuit. A stabilized power supply is used to provide constant voltage to the timing circuit. The entire unit is housed in a cast aluminum box which also contains the necessary terminals for connecting the external wiring.

D50/R987 778

Effect of temperature gradients on the above-below indications of the depth-charge direction indicator. Columbia Univ. - Div. of War Research
July 4, 1944 12p.

Operation of the depth-charge direction indicator is based on the fact that the sound waves from a depth-charge explosion do not all strike all parts of the submarine at exactly the same time. The difference in time of arrival of the sound at any two, or more, points can be used to determine the direction of the source of the sound. In many cases, the variation in the temperature of the

water with depth is so slight that the possible influence of temperature gradients on the recording of the DCDI above-below indicator is negligible. However, where the temperature does vary markedly with depth, it is necessary to apply the corrections, which are explained in this report, if highly accurate indications are desired. Table and graphs are included.

P33/R988 779

GERJUOY, E.

Listening tests on audibility of frequency-translated airplane noise. Columbia Univ. - Div. of War Research
July 1, 1944 3p.

Tests of airplane signal audibility were conducted at the Bell Telephone Laboratories. It was thought that it might be possible to improve the audibility of airplane noise by frequency-translating the signal. This would shift the frequencies so that the energy would lie in a frequency band at which the ear was more sensitive and the headphones more efficient. It was decided that the equipment necessary to raise low-frequency energy to higher frequencies was not warranted at this time.

D55/R989 780

Operating and maintenance instructions for RLI system on USS MACKEREL. Columbia Univ. - Div. of War Research
July 4, 1944 v.p.

The RLI system (right-left indicator) is designed to operate in conjunction with the existing JP-1 sonar equipment on USS MACKEREL. The purpose of the RLI system is four-fold: (1) instant two-way communication is provided between the JP-1 operator and the

control room, (2) a target directional sense is given by a meter that visually indicates to the operator when the target is to the right or left of the hydrophone relative bearing transcribed on the hydrophone shaft azimuth, (3) power training to rotate the hydrophone is provided, and (4) the RLI relative target bearing is repeated at the JP-1 operator's station and at the TDC operator's station. Drawings are included.

D34/R990 781

MACLAUGHLIN, R. R.

Directional modifications for ORSB hydrophone.

Columbia Univ. - Div. of War Research

June 26, 1944 3p.

The preliminary Development specification (D34/R847), dated April 7, 1944, covers the manufacturing requirements for developmental models of the hydrophone and baffle assembly for the ORSB. Since the issuance of that specification, certain developmental work on the hydrophone has been completed. It appears that the results of this work can readily be incorporated in the hydrophone design to simplify its manufacture and improve its performance. This memorandum covers the proposed changes. A drawing is included.

D16/D34/R991 782

Outline of sono-buoy training program for ACG field representatives.

Columbia Univ. - Div. of War Research

N.D. 11p.

This report outlines the sono-buoy training program for ACG field representatives. The program ran from July 3 through August 8, 1944.

D54/R992

783

PROUDFOOT, D. A. and TEAL, E. E.

Submarine internal-communications systems 1 to 7 Mc. Columbia Univ. - Div. of War Research

June 28, 1944 v.p.

Internal-communications systems of Fleet-type submarines have been studied with a view toward recommending changes to improve the performance of these systems. To determine the nature of the difficulties being experienced with the 1- and 7-Mc systems and to evaluate the effectiveness of remedial measures, tests and observations have been made on a number of recently commissioned boats, notably USS PERCH (SS-313), BANG (SS-385), SHARK (SS-314), SEA LION (SS-315), and BECUNA (SS-319). This report summarizes the information leading to recommendations for improvement of these systems and describes in some detail the modifications made to carry out these recommendations in a trial installation on USS BECUNA (SS-319). Photos and drawings are included.

P34/R993

784

LAX, M., and HOFF, H. B.

Notes on conference on the interpretation of acoustical measurements of USS QUEENFISH crash-dive tests.

Columbia Univ. - Div. of War Research

June 27, 1944 2p.

This conference was held to interpret the crash-dive recordings of USS QUEENFISH. This memorandum describes some of the general observations and conclusions made while listening to the magnetic tapes.

D16/R994 785
RIPKEN, J. F.
ERSB comparative parachute test.
Columbia Univ. - Div. of War
Research
June 29, 1944 4p.

This memorandum summarizes the results of comparative tests made on current-production AN/CRT-1A parachutes. The tests were initiated because of reported field parachute failures of the existing type of production. It was found that GTM nylon trial parachutes were squid-proof but unsatisfactory in flight stability at speeds from 130 to 150 knots, while A.L.C. repacked standard parachutes were squid-proof and satisfactory in flight at speeds up to 140 knots. It is recommended that the launching method be improved to reduce antenna damage.

D16/R995 786
BOYERS, J. S.
Visit to Radiotechnic
Laboratory.
Columbia Univ. - Div. of War
Research
June 29, 1944 2p.

The writer visited the Radiotechnic Laboratory of Evanston, IL, which manufactures Model 20N recorders for the Navy. Changes in the recorder were discussed.

D16/R996 787
BOYERS, J. S.
Visit to Utah Radio Products Co.
Columbia Univ. - Div. of War
Research
June 28, 1944 3p.

The writer visited the Utah Radio Products Company of Chicago, IL, which is manufacturing Model 50 wire recorders under a contract from Armour. A development program is also being carried on to improve the recorders.

D16/R997 788
BOYERS, J. S.
Fonda tape recorder.
Columbia Univ. - Div. of War
Research
June 28, 1944 4p.

A Fonda Model AV tape recorder was tested at the New London Laboratory. The results of the testing are discussed. A graph is included.

D55/R998 789
GONGWER, C. A. and SAWYER, C. R.
Outline of power-drive system
for D55 sonar system.
Columbia Univ. - Div. of War
Research
June 28, 1944 2p.

The power drive of the JP-1 training shaft in the D55 sonar system is of the amplidyne type. This memorandum discusses motor mountings for Mare Island training gear, motor mountings for Portsmouth-type training gear, JP-1 gear requirements, strength of training gear, and power of the training motor.

P32/R999 790
SNOW, W. B.
Sonic listening with QB
transducer on submarines.
Columbia Univ. - Div. of War
Research
June 28, 1944 3p.

The QB transducer can be expected to give fair performance as a sonic hydrophone for surfaced submarines moving very slowly. It is not expected to be useful at usual surface speeds. Its bearing accuracy will be much inferior to the accuracies characteristic of either JP sonic or QB supersonic performance.

R1000 791
Instructor's pamphlet for the IS-WAS animated trainer. Columbia Univ. - Div. of War Research
July 10, 1944 12p.

When inserted in a lantern-slide projector, the IS-WAS animated trainer throws on a screen images of the attack course finder and the speed omnimeter. This trainer can be used to show a large class how to use an IS-WAS.

D34/R1007 792
Specification for cylindrical toroidally wound magnetostriction hydrophone and baffle. Columbia Univ. - Div. of War Research
July 14, 1944 v.p.

This specification covers the manufacturing requirements for a hydrophone consisting of two plastic-coated cylindrical toroidally wound magnetostriction hydrophone units, electrically connected in series, and their associated baffles. This specification supersedes a specification (D34/R847) dated April 7, 1944, and incorporates a number of changes and additions.

P33/R1008 793
WOODWARD, L. A.
Addendum I to Maximum Listening Ranges of Underwater Sound Equipment (P33/R794). Columbia Univ. - Div. of War Research
July 1, 1944 6p.

This report is a continuation of the compilation of available information regarding maximum listening ranges of sonic and supersonic equipment. It augments the data shown in table I of the memorandum for file dated March 13, 1944, entitled Maximum Listening

Ranges of Underwater Sound Equipment (P33/R794) by including additional information from submarine war-patrol reports and incorporates these data into the averages shown in table IV of the earlier report. A list of sources is included.

P37/R1009 794
HANSON, R. O.
Birch Flagship model transcription reproducer. Columbia Univ. - Div. of War Research
July 6, 1944 6p.

This is a report of the performance of the U.S. Navy transcription reproducer known as the Birch Flagship model, manufactured by Boetsch Bros. and sent to the New London Laboratory to determine its adaptability for the reproduction of training records. It was found that the reproducer does not meet the requirements of the Laboratory in that (1) frequency characteristics are not as good as required above 5000 cycles, (2) excessive pickup pressure will result in short record life, and (3) speed regulation at 33.3 rpm was not good enough to meet Laboratory standards.

G12/R1010 795
FOLLIN, J. W.
The modified baffle for topside straight hydrophones. Columbia Univ. - Div. of War Research
Aug. 12, 1944 v.p.

The Transducer Group was requested to design a baffle with better front-to-back discrimination. The new baffle is a compromise between low-frequency and high-frequency responses and discriminations. At any given frequency, it is possible to improve the characteristics but, as

an average, very little can be done. At present it seems unlikely that any better materials will be obtained for the pressure-release surface of the baffle so that, if more improvement in characteristic is desired over the whole band, a larger size will be required.

G11/R1011 796

A summary of current training activities of the New London Laboratory.

Columbia Univ. - Div. of War Research
July 5, 1944 9p.

At the present time, the training work at the CUDWR Laboratory consists chiefly of assistance to the submarine service. The tactical range recorder teacher and the ERSB and DRSB training programs are the only ASW activities now underway. The prosubmarine projects include (1) the JP-1 and the S/M sonar training programs, (2) the submarine interior-communications training program, (3) the sound injector, (4) slide projector demonstrators, (5) conversion of conning-officer attack teachers, (6) periscope trainer, (7) miscellaneous audio-visual aids, and (8) the selection of submarine-sonar operators.

P35/R1012 797

HAEFNER, S. J. and WESTNEAT, A. S.

Hipersil core characteristics.
Columbia Univ. - Div. of War Research
July 11, 1944 7p.

The present report shows the ac. permeability of the Hipersil core as a function of flux density for various air gaps, including minimum (butting with 200 lb pressure) 2, 3.4, 5, 9 and 14 mil. The incremental permeability of the Hipersil core with minimum air gap

is shown as a function of ac flux density for values of dc magnetizing force. Graphs are included.

P47/R1013

798

Specification for Relative Bearing Animated Trainer, Mk I Mod 1.

Columbia Univ. - Div. of War Research
July 11, 1944 v.p.

This specification covers the manufacturing requirements for Relative Bearing Animated Trainer, Mk I Mod 1. The trainer is a device for use in a slide projector to project on a screen an image consisting of a bearing circle in which the deck of a ship is centrally located. Another image of a ship is so located that it can be rotated around the central ship.

G12/R1014

799

BERNIER, H. E.

Elimination of longitudinal resonance in the straight magnetostrictive hydrophone.
Columbia Univ. - Div. of War Research
July 7, 1944 1p.

Good sonic listening at voice-frequency ranges is possible only if the longitudinal resonance in the 1000- to 2000-cycle range of a straight magnetostrictive hydrophone can be eliminated. The writer suggests that the rings used to clamp the 5-ft magnetostrictive hydrophone in the modified baffle for topside hydrophones be made of a pure gum butyl.

P37/R1015 800
HANSON, R.O.

Suggestions for a high-fidelity phonograph playback suitable for reproducing recordings of underwater sound.

Columbia Univ. - Div. of War Research

July 6, 1944 2p.

Overall response from 100 to 8,000 cycles should not vary more than plus or minus 4 dB as measured using a test record with a 500-cycle crossover frequency. To reproduce this record properly, a reproducing equalizer that effectively raises the low frequency spectrum, starting at 500 cycles, would have to be included.

P37/R1016 801
HANSON, R.O.

Gimbal-spring mount for phonograph turntables used on shipboard.

Columbia Univ. - Div. of War Research

July 6, 1944 3p.

The problem of operating a phonograph turntable on a small ship at sea is a difficult one. To overcome the roll and pitch of the ship, a gimbal arrangement with a weighted counterbalance can be made up to fit the particular unit to be used. To overcome vibration from engines, etc., a coil-spring mounting is necessary.

D12/R1018 802
HOFF, H. B. and COLE, D. L.

Evaluation of ship spectra measured at Narragansett Range.

Columbia Univ. - Div. of War Research

July 12, 1944 5p.

This memorandum contains a reevaluation of various average ship spectra measured at Narragansett Range (135-ft depth) and reported in Naval Ordnance Laboratory Memo 4931. These data have been reexpressed in terms of dB pressure levels referred to 0.0002 dynes/cm² in a 1-cps band at a distance of 200 ft athwartships of the keel. Graphs are included.

D34/R1019 803

Requirement specification for directional radio transmitting equipment AN/CRT-4, Frequency range 62.6 to 72 Mc.

Columbia Univ. - Div. of War Research

July 7, 1944 v.p.

This equipment shall have all the apparatus necessary for providing a means for detecting, directionally, underwater sounds and transmitting them to nearby aircraft. The equipment shall be an expendable buoy, designed to be dropped from an aircraft via parachute into the sea. It will operate unattended for a minimum of 2 hr and shall then sink.

P34/R1020 804
HERRNFELD, F. P.

Test procedure for audio transformers (35 to 16,000 cps).

Columbia Univ. - Div. of War Research

N.D. 16p.

This report describes test procedures that are carried out on audio transformers (range 35 to 16,000 cps) designed and built at the New London Laboratory. The purpose in issuing the data is to make it available for use in testing transformers built elsewhere. Numerous drawings are included.

D55/R1021 804-1
Installation instructions for
intercompartmental-cabling system for
D55 sonar system.
Columbia Univ. - Div. of War
Research
July 11, 1944 2p.

These instructions cover the
material requirements and
installation procedure for an
intercompartmental-cabling system
between the conning tower and the
forward torpedo room of Fleet-type
submarines. This cabling is required
when the D55 sonar system is to be
installed.

P20/R1022 805
TEAL, E.E.
Additional torpedo-noise
measurements
Columbia Univ. - Div. of War
Research
July 12, 1944 7p.

Since the publication of report
P20/R688, "Merchant Vessel
Protection, Sonic Detection of
Torpedoes from Merchant Ships," by
Snow and Proudfoot, additional noise
measurements have been made on two
enemy torpedoes and the results are
presented in this report. These data
do not appear to alter the
conclusions in the above mentioned
report regarding the torpedo
measurements. Graphs are included.

P33/R1023 806
SNOW, W. B.; HOFF, H. B.; and COLE,
D. L.
Self-noise tests on USS TARPON on
755 receiver and QB transducer.
Columbia Univ. - Div. of War
Research
Sept. 14, 1944 11p.

This memorandum reports the
results of tests conducted aboard USS
TARPON on May 2, 1944. The graphs
that accompany the report show the
order of magnitude of the effects of
speed on detection and detectability.

D16/R1024 807
BOYERS, J.S.
Tests on the pilot model
modified 20N magnetic-wire recorder.
Columbia Univ. - Div. of War
Research
July 11, 1944 7p.

A Model 20N wire magnetic
recorder modified by Radiotechnic
Laboratories of Evanston, IL, has
been sent to this Laboratory for
tests. Several items in this unit
are to be changed in the production
models. A proposed test data sheet
and several photographs are
included.

D16/R1025 808
RIPKEN, J.F.
ERSB comparative parachute
tests.
Columbia Univ. - Div. of War
Research
July 11, 1944 6p.

This memorandum summarizes the
results of comparative drop tests
made on 2 types of 20-in.
parachutes and 1 type of 24-in.
parachute, designed to correct the
deficiencies of the present
AN/QRT-1A type of parachute
system. All three types of
parachutes operated satisfactorily
under the test conditions described
for launching speeds from 140 to
160 knots.

Antenna collapse and radio
frequency shift were of greater
magnitude with the 20-in.
parachutes than in comparable tests
with the standard 24-in. para-
chutes, but most cases yielded
usable results.

D50/R1026 809
MODE, D.E.
Experimental depth-charge range
indicator, no. 3.
Columbia Univ. - Div. of War
Research
July 12, 1944 3p.

This memorandum describes an experimental depth-charge range indicator recently completed by the Electronics Group. The device is intended to give visual recognition by means of indicator lamps that light to show the peak strength of a signal received from a hydrophone. A drawing is included.

D55/R1027 810
BARRETT, L. R.

Temperature rise of 1/6-hp amplidyne M/G unit in sound reproduction cover #4007. Columbia Univ. - Div. of War Research
July 17, 1944 4p.

A series of tests have been conducted to determine whether the temperature rise of the 1/6-hp amplidyne M/G unit is excessive when enclosed in sound reduction cover #4007. The M/G unit was set up to provide power to drive a 1/6-hp amplidyne motor of the permanent-magnet type. As a result of the test, it is believed that the 1/6-hp amplidyne M/G unit can be safely operated continuously at rated hp in sound reduction cover No. 4007.

G10/R1028 811
GERJUOY, E.

Electromagnetic waves in conducting media, part I. Columbia Univ. - Div. of War Research
July 17, 1944 10p.

This memorandum discusses the attenuation and propagation of electromagnetic waves in a conducting medium. The transmission of electromagnetic waves in a dissipative medium, like sea water, differs in many important respects from the transmission in air. The treatment in this memorandum follows that of Stratton, Electromagnetic Theory, McGraw-Hill Book Co., Inc., New York, NY, 1941.

P52/R1029 812
JONES, M. B.

Effect of relative ranges and speeds of submarine and DE on sounds heard over ERSB. Columbia Univ. - Div. of War Research
July 12, 1944 3p.

Three sea trips were made to obtain recorded material of submarine and DE underwater sounds for use in the expendable radio sono buoy training records. Incidental to these recordings, certain observations were made concerning the masking effect of the DE signal over the submarine signal at various distances and speeds. The results of the three events are given in table form.

P58/R1030 813
NEFF, W. D. and SMITH, K. R.

Report on training course for submarine-sonar instructors. Columbia Univ. - Div. of War Research
July 12, 1944 4p.

A brief summary is given of the submarine sonar instructors' training course. This course is the first step in an attempt to establish an efficient general training program.

P33/R1031 814
GRAHAM, W. F.

Tests of JP-1 equipment with 3-, 4-, and 5-ft hydrophones and QB sound gear. Columbia Univ. - Div. of War Research
Jul. 13, 1944 3p.

On June 9, 1944, comparative listening-range measurements of the 3-, 4-, and 5-ft hydrophones and the QB sound gear were made on USS BAYA. Listening conditions were poor because of natural conditions and submarine-made interference. Calculated maximum listening ranges and a graph are included.

D34/R1032 815
ARCHER, G. W.

Regulated power supply for use with DRSB receiving equipment. Columbia Univ. - Div. of War Research
July 15, 1944 4p.

The Electronics Group has completed and tested a regulated power supply for use with the DRSB receiving equipment. In the final design, the requirements were met and, from the further measurements that were made, the overall performance of the equipment appeared to be satisfactory. A drawing is included.

P48/R1033 816
ARCHER, G. W.

Sound injector. Columbia Univ. - Div. of War Research
July 21, 1944 4p.

The Electronics Group has completed a sound injector to be used as a training aid. The injector simulates ship-propeller sounds. The ship's propeller sounds are generated by "keying in" the random noise from a gas tube at a rate to correspond to the propeller-blade beats. Drawings are included.

D53/R1034 817
LOYE, D. P. and WAGNER, R. A.

Submarine-noise measurements at the Canal Zone, Pearl Harbor, Midway, and Mare Island. Columbia Univ. - Div. of War Research
July 18, 1944 6p.

This memorandum contains a summary of the submarine-noise measurement program recently conducted at Balboa in the Canal Zone, and at Pearl Harbor, Midway, and Mare Island. This report lists the separate reports that have been

prepared for each location. It also presents a general summary and recommendations. A table captioned "Combination of Field and New London Submarine-Noise Measurement Differences Navy Sound Range Versus Dockside with Hydrophone Overside" is included.

D16/R1035 818

The expendable radio sono buoy. Columbia Univ. - Div. of War Research
July 27, 1944 56p.

One of the most successful developments of the New London Laboratory has been that of the expendable radio sono buoy for use in aircraft reconnaissance. By virtue of its ability to pick up underwater sounds and relay them with good fidelity by radio, this device enables aircraft to detect and localize the position of submerged submarines. The buoys are launched from blimps or airplanes. They become operative as soon as they reach the water, remain in continuous operation for 2 to 4 hr, and then sink. This completion report contains photographs and a bibliography.

P52/R1036 819
TRAINING GROUP

Outline of sono buoy training program for ACG field representatives. Columbia Univ. - Div. of War Research
July 19, 1944 12p.

This report consists of an outline of the sono buoy training program for ACG field representatives. Both ERSB's and DRSB's are considered.

P52/R1037 820
ZERN, R. T.

Filter and mixer unit for the directional radio sono-buoy trainer. Columbia Univ. - Div. of War Research
July 21, 1944 4p.

The Electronics Group has, at the request of G. D. Gillett, completed the filter and mixer unit required for the directional radio sono-buoy trainer. The function of this unit is to modify the input signal to accurately simulate one from a hydrophone over the entire range.

D55/R1038 821
CALLEN, R. J.

Trip to the RCA-Victor factory at Indianapolis, IN. Columbia Univ. - Div. of War Research
July 24, 1944 3p.

The purpose of the trip was to deliver to RCA new and recently revised drawings of the D-55 system, as well as performance curves of chassis A, B, and C of pilot model no. 1, and to serve in a consulting capacity concerning the RLI systems that are now being designed and built at this RCA-Victor plant.

D38/R1039 822
SNOW, W. B.

JP Hydrophone after approximately 3 months through-the-hull service. Columbia Univ. - Div. of War Research
Jul. 19, 1944 4p.

A photograph shows the physical condition of a standard JP hydrophone that was removed from a through-the-hull mount after it had been in service less than 3 months. It is believed that, in service, a pinhole corroded through

at some point, flooding the hydrophone. This allowed strong electrolytic action between the iron armature and the nickel tube. The ship's crew had not reported the hydrophone inoperative, but merely very noisy. A graph is included.

P60/R1040 823
SCHELL, F. T.

Modification of WCA-training equipment. Columbia Univ. - Div. of War Research
July 24, 1944 5p.

This memorandum discusses the progress being made on the problem of modifying the present WCA training equipment to provide for rotation of the starboard shaft, carrying the QB projector, at a speed of approximately 12 rpm, with a minimum of mechanical and electrical changes, and the retention of the regular training speeds of 1/3 to 4 rpm of the shaft for normal operations. It is recommended that the TB20 reductor be replaced by a TB66 and that test runs be made under all conditions.

P52/R1041 824
WILDING PICTURE PRODUCTIONS, INC., Chicago, IL.

Directional radio sono buoy. Columbia Univ. - Div. of War Research
June 28, 1944 27p.

This report is a script for a movie that describes the directional radio sono buoy and its operation.

D53/R1042

825

TEAL, E. E. and PRATT, R. W.

Analyses of reduction-gear noise in water, USS BLACKFIN (SS-322).

Columbia Univ. - Div. of War Research

July 24, 1944 v.p.

Analyses of the water borne noise from the reduction gears and associated equipment of USS BLACKFIN (SS-322) were made at the Electric Boat Company's dock before and after noise-reduction measures had been taken on the port gear. The noise-reduction measures involved honing irregularities in the gear teeth with a stone. There is no clear evidence of a substantial reduction in the noise. It is expected that these tests will be repeated after the gears have been allowed to run in for about week. If there is no improvement, it is expected that a study of the pump mechanism will be made. Graphs are included.

P60/R1043

826

Detection of torpedoes by submarines.

Columbia Univ. - Div. of War Research

July 25, 1944 8p.

On the basis of the trials thus far conducted, it is believed that effective torpedo-detection facilities can be provided for our submarines merely by replacing the present gear box with a unit of identical construction but having a lower gear ratio and by the addition of slip rings suitably mounted on the projector shaft. It is also believed that an approaching torpedo can be detected by using the standard echo-ranging amplifier. It is recommended that a chemical recorder be used to obtain a permanent record of signal level as a function of bearing angle.

D16/R1044

827

RIPKEN, J. F.

Wind-tunnel tests of ERSB paracnute.

Columbia Univ. - Div. of War Research

July 25, 1944 4p.

This memorandum summarizes comparative wind-tunnel tests of ERSB parachutes. Ten parachutes were tested, involving differences in size, porosity, and hem shape. Data indicate that the buoy can perform satisfactorily with a parachute having a 24-in. diameter, 20-in. shroud length, and a cloth porosity restricted to values between 140 and 160. In addition, a definite overall improvement in stability can be achieved by scalloping the lower hem. These data also indicated that 20-in. diameter parachutes can be used with considerable freedom in porosity variation, provided secondary impact effects are not detrimental to buoy operation.

D55/R1045

828

SAWYER, O. E.

D55 sonar-equipment modification, conference of June 29, 1944, Washington, DC.

Columbia Univ. - Div. of War Research

July 25, 1944 3p.

A meeting between BuShips and CUDWR was held to discuss the D55 sonar system and the JP-1 training system. Major points considered at the meeting included (1) status of drawings, parts, and specifications, (2) JP-1 training gear, (3) bearing repeater system, (4) RLI cabinet and, (5) general.

P29/R1046 829
MODE, D. E.

Experimental FM 150-kc sweep oscillator, Model 1.
Columbia Univ. - Div. of War Research
July 26, 1944 6p.

This memorandum describes a sweep-frequency oscillator recently completed by the Electronic Design Group. A circuit schematic and a chassis layout are attached. The oscillator is designed to generate a sweep frequency, the bandwidth of which is selective in five steps of 1/2, 1, 2, 4, and 6 kc centered around a frequency of 150 kc.

P33/R1047 830
SNOW, W. B. and HOFF, H. B.

Self-noise measurements on Fleet-type submarines through JP-1 hydrophones.
Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

This memorandum presents the results of an extended series of measurements of self-noise obtained through JP-1 hydrophones on representative Fleet-type submarines. In general, it is believed that the self-noise observed during these tests originated in the propulsion machinery and auxiliaries and that it is transmitted directly to the hydrophone through vibration of the mounting as well as by transmission through the water.

D16/R1048 831
BOYERS, J. S.

Recommended changes in the Model 20N wire recorders.
Columbia Univ. - Div. of War Research
July 27, 1944 2p.

Several faults in the Model 20N wire recorders, as modified by this Laboratory, are discussed in this report.

D50/R1049 832
MARKHAM, J. J.

Effect of thermal gradient on DCDI above-below indication.
Columbia Univ. - Div. of War Research
Aug. 8, 1944 20p.

During some tests on the depth charge direction indicator, some inconsistency was found in the above-below indications. Preliminary calculations indicated that strong thermal gradients will affect these indications. The above-below indication on the DCDI shows whether the depth charge is above or below the dividing surface, not the horizontal plane at the middepth of the submarine (as in the idealized case). We can determine the depth of this dividing surface at a given range for a given thermal gradient, obtained from the submarine bathythermograph, with the aid of the accompanying charts. An appendix is included.

P20/R1050 833
SNOW, W. B. and TEAL, E. E.

Tests on the Electro-Protective Corp. torpedo detector.
Columbia Univ. - Div. of War Research
Nov. 15, 1944 v.p.

This report supplements "Merchant Vessel Protection, Sonic Detection of Torpedoes from Merchant Ships," W. B. Snow and D. A. Proudfoot (P20/R688). A more complete description is given of the operation of the torpedo detector manufactured by the Electro-Protective Corporation. The tests indicate that the equipment can be adjusted to obtain increased

sensitivity. This is accomplished by operating with the average channel relay current nearer the cut-in value than the 2 mA suggested in the instruction manual. Tests were made to determine the discrimination of the equipment between background noise and torpedo noise. Graphs are included.

D50/P55/R1051 834
Preliminary specification for NL-130 hydrophone.
Columbia Univ. - Div. of War Research
July 31, 1944 v.p.

This specification covers the mechanical, electrical, and performance requirements of the NL-130 hydrophone, as used in the depth-charge direction indicator and in the noise level monitor. The NL-130 hydrophone is of the permanent-magnet magnetostrictive type, made up of one straight toroidally wound coil section 6-in. long. The hydrophone element is covered by a rubber sheath and the assembly is plastic-filled to form a unit 10 in. long, 2-1/2 in. in diameter, and weighing 2 lb. Drawings are included.

P55/R1052 835
WAGNER, R. A.
Comparative noise level monitor and standard range noise tests on USS BESUGO (SS-321).
Columbia Univ. - Div. of War Research
July 31, 1944 6p.

To obtain a reference whereby noise levels measured through the noise-level monitor system could be related to noise levels as reported from measurements made by the Navy on a standard sound range, the procedure described in this report was carried out. Tables are included.

P33/R1053 836
COLE, D. L. and HAEFNER, S. J.
Peak recognition tests.
Columbia Univ. - Div. of War Research
Aug. 14, 1944 v.p.

In connection with hydrophone development programs, it has frequently been desirable to determine the magnitudes of resonance peaks that are permissible without appreciably impairing the quality of the signals received. The test described in this paper was conducted to identify these tolerable magnitudes. The test equipment setup consisted of a playback system, in which there was inserted a variable equalizer circuit, by means of which peaks of controllable magnitudes and widths could be produced in the reproduction of typical ship records. Two records were used, one of a patrol yacht and the other of a submarine. The results indicate that a peak height of 6 dB will be unlikely to interfere with listening or to produce annoyance; peak heights are to be avoided.

D55/R1054 837
CALLEN, R. J.
Visit to F. W. Sickles Co.
Columbia Univ. - Div. of War Research
Aug. 3, 1944 3p.

On July 24, 1944, R. J. Callen and E. E. Noyes, of the Laboratory, visited the F. W. Sickles Co., Chicopee, MA, to discuss design changes to assure Navy approval of components which that company will manufacture for RCA-Victor as parts of the supersonic converter in the D55 system.

D53/R1055 838
PROUDFOOT, D. A. and TEAL, E. E.

Measurements of self-noise of a submarine at several speeds on the surface.

Columbia Univ. - Div. of War Research

Aug. 4, 1944 3p.

Measurements were made on July 18, 1944, on USS BESUGO (SS-321) that indicate the magnitude of the self-noise of this vessel as picked up by a nondirectional hydrophone mounted inside the hull in the forward torpedo room. The results are discussed in this report. A graph is included.

P55/R1056 839
PRATT, R. W. and SCHULZE, R. C. R.

Comparative noise-level monitor and standard range noise tests on USS SEA FOX (SS-402).

Columbia Univ. - Div. of War Research

Aug. 8, 1944 14p.

To obtain a reference whereby noise levels measured through the noise level monitor system could be related to noise levels as reported from measurements made by the Navy on a standard sound range, tests were made. These tests differ only slightly from similar tests made on USS BESUGO and reported in P55/R1052. Tables are included.

G10/R1057 840
GERJUOY E.

Electromagnetic waves in conducting media, Part II.

Columbia Univ. - Div. of War Research

Aug. 8, 1944 12p.

In this memorandum, the effect of bounding surfaces on the propagation of plane waves in the conducting medium is discussed. In general, a plane wave in the ocean

incident on the surface will be reflected back into the ocean with only a very small fraction of the energy transmitted into the air. The author suggests that a submarine antenna will probably have to be designed as a loop, which will respond primarily to the magnetic vector. The submarine should not operate within a quarter wavelength of the surface. Also, experiments with wooden-hulled surface vessels may have little bearing on the best equipment design for the submarine.

G10/R1058 841
GERJUOY, E.

Electromagnetic waves in conducting media, Part III.

Columbia Univ. - Div. of War Research

Aug. 10, 1944 5p.

This memorandum concludes that if electromagnetic communication is to be possible in the sea water, it will only be possible because the communication takes place close to the air surface. Proof is included.

D53/R1059 842
LOYE, D. P. and PROUDFOOT, D. A.

Proposed submarine machinery noise-reduction program.

Columbia Univ. - Div. of War Research

Aug. 8, 1944 4p.

This memorandum outlines a program for quieting submarine auxiliary-machinery noises. It suggests that a test facility be built to assist in analyzing the noise and vibration of tactically important auxiliary machinery. This test station will consist of a floating tank built to simulate submarine-hull construction as closely as practicable.

G1/R1060 843
SNOW, W. B. and MANINGER, R. C.
Comments regarding JICPOA item
6375 and JICPOA item 8646.
Columbia Univ. - Div. of War
Research
Aug. 9, 1944 6p.

The comments in this memorandum give specifications and inferences prompted by a study of translations of two captured Japanese documents. The data therein are also compared to similar data obtained from Navy or NDRC tests and reports. The notes of the two authors were prepared individually and are given separately so that two viewpoints can be presented.

P35/R1061 844
SNOW, W. B.
Notes regarding visit to San
Diego Laboratory.
Columbia Univ. - Div. of War
Research
Aug. 24, 1944 3p.

A new sound-level meter, known as the SL-1, has just been completed. Associated with the SL-1 sound-level meter is a filter set, designated the SA-1. Transformers manufactured by Hollytran have been used by the San Diego Laboratory. It has been pointed out that in the SASAT, use is made of a bridge-stabilized oscillator which employs only one tube and one stabilizing lamp. The San Diego Laboratory has found a plastic-insulated cable manufactured by the Whitney-Blake Company entirely satisfactory for internal, or chassis and rack wiring. The D. P. Mossman Company manufactures a very satisfactory switch for power or audio circuits. The San Diego Laboratory preferred copper-clad sheet steel for the fabrication of chassis.

P55/R1062 845
SNOW, W. B.
Masking attachment for the
noise-level monitor.
Columbia Univ. - Div. of War
Research
Aug. 10, 1944 3p.

The New London Laboratory has produced and installed on USS SEAFox and USS BESUGO two models of the submarine noise-level monitor. These installations consist of four small hydrophones, mounted at appropriate positions along the pressure hull of the submarine, and appropriate additions to the NL-105 amplifier of the JP-1 equipment which make it possible to read noise levels on a volume indicator. The San Diego Laboratory proposed a different type of noise-level monitor in which the submarine noises would be measured by determining the amount of artificially injected noise necessary to mask them. It was thought the two methods could be combined rather simply or that, if the masking test proved to have any advantages over the simple measurement technique of the New London design, the latter could be rebuilt to employ the masking method with little lost motion. Tests were conducted and it was concluded that the New London Laboratory would make up more noise level monitor outfits and these will not include the masking attachment.

P33/R1063 846
SNOW, W. B. and HOFF, W. B.
Surface self-noise tests of 755
receiver and QB transducer, on USS
BESUGO, CAIMAN, and SEA FOX.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 13p.

This memorandum reports the results of miscellaneous surface

self-noise tests conducted by engineers from the Laboratory onboard the submarines BESUGO, CAIMAN, and SEAFOX during the months of July and August, 1944. These measurements were made to give a basis for predicting ranges obtainable on torpedo-detection modification (TDM) equipment using the 755 receiver and a continuously rotating QB transducer. Torpedo detection ranges were computed using the USS CAIMAN surface self-noise data as a basis. These tests were conducted on the WCA-2 equipment using the QB transducer. The noise levels were obtained on the volume indicator of the 755 receiver. The receivers were calibrated by inserting known voltages in series with the QB transducers across a 1-ohm resistance. The input circuits were modified for unbalanced input during calibration by removing the center-top ground on the input transformer and transferring it to one side of the line. Results of the tests are given.

D34/R1064 847
CLEARWATERS, W.L.
400-cycle Highpass filter for DRSB receiver.
Columbia Univ. - Div. of War Research
Sept. 19, 1944 10p.

In connection with certain calculations involving the DRSB, it was found that the peaked response of the hydrophone at 300 cps tended to give the overall system curve a peak at this point. In view of this, it was decided to design a filter to cut off all sounds below 400 cps and have a flat response above that. This memorandum describes a simple two-section filter that has been built and which could be used to give the desired filtering action. Future tests on this filter may prove

whether it will be desirable in the DRSB receiver. Response curves and schematics diagrams are included.

P55/R1065 848
PRATT, R. W.
Operating instructions for cavitation indicator, supplement to noise-level monitor.
Columbia Univ. - Div. of War Research
Aug. 10, 1944 2p.

The cavitation indicator indicates whether or not cavitation is being produced by the propellers and is intended for use when the ship is rigged for quiet operation. The procedure for operating it is given.

P55/R1066 849
WAGNER, R. A.
Notes on work done on USS BESUGO at Key West.
Columbia Univ. - Div. of War Research
Aug. 11, 1944 4p.

Work, primarily in connection with the noise-level monitor equipment, was carried out on USS BESUGO at Key West from 2 to 4 August, 1944. Roughly, it was divided between an effort to instruct the ship's personnel in the operation, applications, and limitations of the gear and a continuation of the operational work begun at New London. Some incidental work was done with the JP-2 installation and with the QB head and auxiliary 755 amplifier, used to measure supersonic energy distribution as a function of relative bearing. Tests were made with the equipment and the results are discussed.

AD-A163 596

ANNOTATED BIBLIOGRAPHY OF UNDERWATER ACOUSTIC RESEARCH
1942-1945(U) NAVAL UNDERWATER SYSTEMS CENTER NEW LONDON
CT NEW LONDON LAB K M COOK ET AL 02 NOV 83

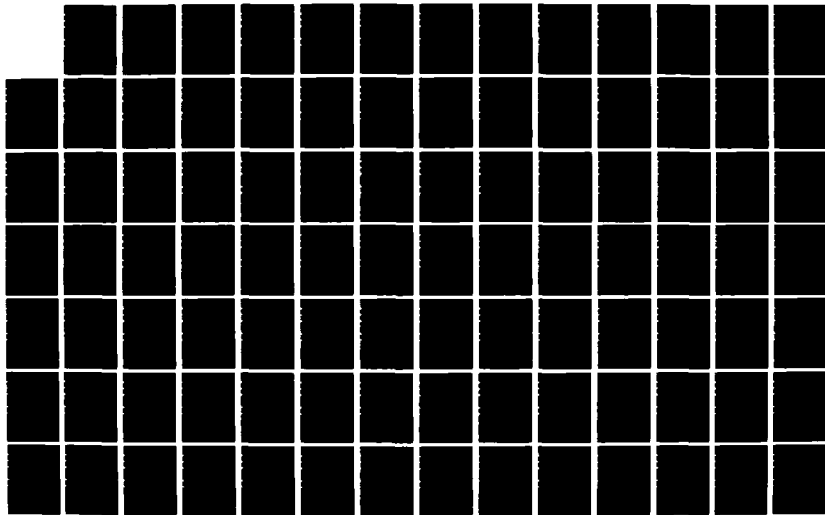
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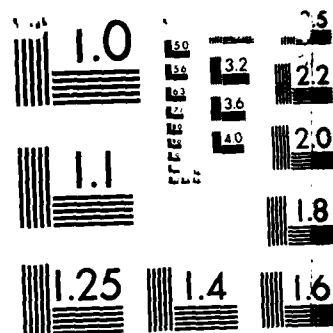
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

P33/R1067 850
GRAHAM, W. F. and MANINGER, R. C.
Directivity at low sonic
frequencies.
Columbia Univ. - Div. of War
Research
Nov. 8, 1944 14p.

The tests discussed in this memorandum show that it is possible to obtain more satisfactory bearing accuracy on low-frequency sonic signals with two small hydrophones separated by 3 ft and used binaurally or diotically than with a 3-ft line. In view of the results obtained, a diotic listening system with two small hydrophones separated by 3 or 5 ft that can be connected in series-aiding or series-opposing would be sufficient to give useful directivity at low frequencies. Curves and diagrams are included.

D53/R1068 851
LOYE, D. P.; WAGNER, R. A.; and
PRATT, R. W.
Overside noise measurements of
submarines.
Columbia Univ. - Div. of War
Research
Sept. 12, 1944 v.p.

This manual discusses a completion report and recommendations relating to overside noise measurements of submarines. This system is intended primarily for detecting abnormally noisy auxiliary-machinery units during the course of construction. By detecting faults well in advance of the commissioning of a submarine, they can be remedied before the new boat leaves the yard. Such measurements can also be made of submarines before, during, and after the refit operations. Overside measurements can be made on submarines at docks, secured to buoys, anchored, or drifting. Recommended operating

procedures are presented in detail in the body of this report, and in summary form in table II. Drawings are included.

D55/R1069 852
SAWYER, C. R.
The Model JT sonar equipment.
Columbia Univ. - Div. of War
Research
May 25, 1945 49p.

This manual is a completion report of the Model JT sonar equipment that was developed as a result of recommendations to develop a modernization of the JP-1 sound-receiving equipment. The use of a split hydrophone and a right-left indicator system permits more accurate determination of bearings. A supersonic converter allows targets to be tracked sonically or supersonically. Power training, a two-way talkback system, and various other new features add to the ease of operation and the speed with which data can be transmitted. Drawings, photos, and graphs are included.

D34/R1071 853
CARPENTER, T. H.
Tests on DRSB top section.
Columbia Univ. - Div of War
Research
Aug. 28, 1944 3p.

This memorandum discusses tests on two dummy D34 buoys launched base-down from the tunnel hatch of a PBV at 130 knots, and 300 ft altitude, August 9, 1944. The results of the tests, as observed from retriever and aircraft, are outlined in detail.

D54/R1072 854
MODE, D. E.
15 W volume compression
amplifier.
Columbia Univ. - Div. of War
Research
Aug. 14, 1944 5p.

A 15 W, 20 to 400-cycle speech
amplifier having selective volume
compression for project D54 is the
topic of this memorandum. The
attached curves show the frequency
response at 15-W output, the
compression characteristics, and
the harmonic distortion versus
frequency. A drawing is also
included.

D55/R1073 855
HERRNFELD, F. P.
Tests of CTC Exp. 180 and Exp.
181 transformers.
Columbia Univ. - Div. of War
Research
Aug. 14, 1944 3p.

Input transformers manufactured
by the Chicago Transformer Co. were
tested as replacements for the
16712-BE and 16516-BE input
transformers. Comparative test
results are outlined and a
frequency curve is included.

D55/R1074 856
CALLEN, R. J.
Visit to the Chicago
Transformer Company, July 31, 1944.
Columbia Univ. - Div. of War
Research
Aug. 14, 1944 2p.

The purpose of the visit to the
Chicago Transformer Co. was to
discuss with the engineers design
details of filters and transformers
which that company expects to
manufacture for RCA Victor for use
in the D55 RLI system. Physical
dimensions of these components were
also required by RCA engineers to
complete chassis layout.

P29/R1076 857
HORTON, J. W.
Echo-ranging from submarines.
Columbia Univ. - Div. of War
Research
Aug. 16, 1944 3p.

The equipment used at present
in echo-ranging is discussed and a
suggestion is made that a chemical
recorder take the place of that
currently used. Range-indicator
requirements, as desired by
submarine commanders, are discussed.

D53/R1078 858
WAGNER, R. A.
Notes on introduction of
overside submarine measurements at
Portsmouth Navy Yard.
Columbia Univ. - Div. of War
Research
Aug. 19, 1944 2p.

On his arrival at the
Portsmouth Navy Yard on August 11,
1944, he explained the oversee
system of submarine noise
measurement to the people
responsible for its use there.
Recommendations were made in regard
to equipment handling, personnel
requirements, and operating
procedure. Then, as a preliminary
exercise in the use of the Model
OAY sound-measuring equipment and
to form some idea of the background-
noise conditions, a short survey
was made of the available submarine
berths. The results are summarized
in the memorandum. The results
indicate that under properly
controlled conditions dockside
measurements should be satisfactory.

P55/R1079 859
Preliminary installation and
maintenance instructions for noise-
level monitor.
Columbia Univ. - Div. of War
Research
Oct. 10, 1944 v.p.

The noise-level monitor (NLM) is an equipment for installation on submarines to enable the sound personnel to measure changes in the noise projected into the water by the boat. Frequent checks can be made of the important auxiliary-machinery and underway noise. This information is desirable when the boat is operating on evasive tactics. This book describes installation and maintenance of the equipment.

P55/R1080 860
Preliminary operating instructions for noise-level monitor.
Columbia Univ. - Div. of War Research
Sept. 30, 1944 v.p.

This book describes operation of the noise-level monitor and the cavitation indicator. The noise-level monitor (NLM) is an equipment for installation on submarines to enable the sound personnel to measure the changes in the noise projected into the water by the boats. The cavitation indicator is an equipment that indicates, by means of a neon lamp, when the propellers of the boat are producing cavitation. This information is desirable when the boat is rigged for quiet operation.

P60/R1081 861
PROUDFOOT, D. A. and KNUDSON, W. T.
Sonic detection of torpedoes from a submarine.
Columbia Univ. - Div. of War Research
Aug. 21, 1944 16p.

This report is concerned with an evaluation of the characteristics and performance on USS DOLPHIN (SS-169) of a torpedo-detecting device manufactured by the Electro-Protective Corporation, and with measurements of the self-noise generated by two submarines at

various speeds on the surface. The Electro-Protective torpedo detector, which is responsive to the frequency band between approximately 1500 and 3000 cycles, gave an alarm detection of six Mark XIV-3A torpedoes at distances ranging from 500 to 1900 yd, corresponding to detection times of 20 to 115 s under favorable weather conditions. With rough weather, the detection time would undoubtedly be reduced substantially. Laboratory adjustments of the equipment, using phonograph recordings of the torpedo noise, increased the minimum detection time from 20 to 50 s. Such adjustments may or may not be possible while on patrol with the amount of training currently being given to sonar operators. The alarm feature of this equipment provides an automatic indication of the approach of a torpedo but close adjustment is required for best results. Aural monitoring may be expected to provide a substantial increase in detection range beyond that provided by the alarm.

D16/R1082 862
SUTER, H.
ERSB tests using 12 frequencies.
Columbia Univ. - Div. of War Research
Aug. 22, 1944 4p.

This memorandum describes ERSB tests made using 12 frequencies, the 6 frequencies added to those currently in use being spaced the usual 0.8-Mc apart and added to the lower end of the current frequency band. To maintain the color system of frequency designation, the currently used 6 frequencies are said to be in the black frequency band, while the added 6 frequencies are in the white band. This system lends itself well to conversion to 12-frequency operation. For this reason, the new purple, orange, blue, etc., buoys will be referred to as "PW," "OW," "BW," etc., and the old ones will be "PB," "OB," "BB," etc.

D34/R1083 863
RIPKEN, J. F.

Flight test of G.T.M. D34 top-end assemblies.
Columbia Univ. - Div. of War Research
Aug. 21, 1944 4p.

This memorandum summarizes the results of PBY flight tests made August 14, 1944, of four dummy D34 units equipped with sample preproduction top end assemblies as designed by General Textile Mills, Inc. The procedure of testing is given and the results are listed.

D16/R1084 864
RIPKEN, J. F.

ERSB comparative parachute tests.
Columbia Univ. - Div. of War Research
Aug. 21, 1944 5p.

The purpose of this memorandum is to summarize comparative drop tests of 18 ERSB parachutes made on August 9, 1944. These included 6 standard G.T.M. packs and 12 A.L.C. packs containing the special scalloped-hem parachute as designed at New London. The tests established that the new parachute was not a satisfactory replacement for the present unit and that more, rather than less, "squidding" might be expected with its use. These tests were made to determine the influence of hem design on squidding characteristics of the ERSB parachute, and constitute a flight check on the wind-tunnel tests described in D16/R1044-827.

D51/D55/R1085 865
NOSKER, L. W. and STEPHENSON, R. G.

Initial design of TLR and RLI sonic amplifier.
Columbia Univ. - Div. of War Research
Aug. 22, 1944 5p.

This memorandum describes the design of a right-left indicator system suitable for a triangulation

system on USS S-48. The preamplifier is described, as is the BDI circuit. The audio unit is described in detail.

P55/R1087 866

Specification for Model NL-131 junction box.
Columbia Univ. - Div. of War Research
Aug. 24, 1944 v.p.

This specification covers the manufacturing requirements for a watertight junction box. The junction box provides a watertight chamber into which six 1/2-in. and one 7/8-in. diameter rubber-covered cables can be run for splicing.

P55/R1090 867

Specification for Model NL-133 cavitation indicator.
Columbia Univ. - Div. of War Research
Aug. 30, 1944 6p.

This specification covers the manufacturing requirements for the Model NL-133 cavitation indicator. The Model NL-133 cavitation indicator is used in connection with the noise-level monitor equipment and the auxiliary 755 amplifier to indicate the production of cavitation by the propellers of the ship. The indicator equipment is mounted in a steel box having a removable back. The equipment consists of an audio transformer, a resistor, and a neon lamp that flashes intermittently to indicate the degree of cavitation. The connection jack is mounted on the right-hand end of the indicator. The unit is 4 in. long, 3-3/4 in. wide, 2-1/2 in. deep. Its weight is 1-3/4 lb.

D53/R1091 868
LOYE, D. P.

Bearing howls on submarines recently tested.
Columbia Univ. - Div. of War Research
Aug. 25, 1944 3p.

This memorandum includes a list of submarines that have been sound tested during an 8-month time period. The list includes the dates of the reports and notes regarding whether or not shaft howls were noted. Maximum howl intensities are given. From the data collected, it appears that shaft howls still occur on submarines and two methods are proposed to determine which bearing or packing gland is causing the howl.

612/R1092 869
Hydrophone tests adopted at the New London Laboratory of Columbia University, Division of War Research. Columbia Univ. - Div. of War Research
Sept. 1, 1944 5p.

The Hydrophone Standards Committee of the New London Laboratory, Columbia University, Division of War Research, with the Office of Scientific Research and Development, has adopted certain tests to measure important characteristics of hydrophones. While these tests were developed for hydrophones built at the New London Laboratory, it is felt that they are of sufficient interest to merit consideration by other groups. It is the purpose of this report to effect such distribution of this test information.

P28/R1093 870
PERRY, G. R.
Effects of salinity in Block Island Sound. Columbia Univ. - Div. of War Research
Sept. 5, 1944 22p.

This study has been made in an attempt to ascertain whether salinity can safely be ignored in calculating sound-ray paths in eastern Long Island Sound. Several subsidiary investigations were also made, using the data of this study, and these are reported in the last section of this memorandum.

P55/R1094 871
Specification for Model NL-134 magic eye indicator mount. Columbia Univ. - Div. of War Research
Aug. 31, 1944 5p.

This specification covers the manufacturing requirements for the Model NL-134 magic eye indicator mount. The Model NL-134 magic-eye indicator mount is used in connection with the JP sound listening equipment to provide a mounting, in location near the JP training gear, for the magic eye indicator removed from the JP amplifier panel at the time of installation of the Model NL-132 noise-level monitor adapter. It consists of a drip-proof housing for the type GE5 magic-eye tube, a bracket for mounting the housing on the JP training gear, and a cable and plug for connection to the JP amplifier. Two different mounting brackets are provided with each unit. The proper bracket will be selected when the mount is installed. The mount is approximately 9 in. long, 5 in. wide, and 2 in. high. The weight of the complete mount, including one mounting bracket, is approximately 3-1/2 lb.

D55/R1095 872
SAWYER, C. R.
Report of trip to Portsmouth Navy Yard, August 16, 1944. Columbia Univ. - Div. of War Research
Aug. 28, 1944 3p.

A trip was made to the Portsmouth Navy Yard on August 16, 1944, with regard to the location of WCA-type conversion units on USS THORNBARK (SS-418). At the earlier conference, it was agreed that we would make layouts to determine where the components should be located in the space now occupied by the officer's shower, assuming this facility was moved to the space opposite the officer's pantry. Since a 381 class

boat was not available at New London during this period, it was felt desirable to obtain necessary dimensions and discuss the subject further at the Portsmouth Navy Yard. Equipment locations and installation problems are discussed further.

P50/R1096 873
Instructions for playing the special JP demonstration records. Columbia Univ. - Div. of War Research
Sept. 1, 1944 8p.

Instructions for installation and operation of the special JP demonstration record player are given. Instructions for connecting a standard record player to the JP amplifier are also included.

D34/R1097 874
MACLAUGHLIN, R. R. and VAN LENNEP, D. W.

Performance characteristics of the DRSB hydrophone and baffle. Columbia Univ. - Div. of War Research
Aug. 29, 1944 9p.

This memorandum covers the results of acoustic calibrations made on an initial series of directional radio sono-buoy hydrophones and a complete hydrophone and baffle assembly. The performance characteristics of D-103 and baffle are shown in figures 1 to 5.

D27/R1098 875
Development of recoverable bomb. Columbia Univ. - Div. of War Research
Oct. 25, 1944 4p.

This memorandum covers the development of the recoverable bomb and the New London Laboratory's involvement in the project. At the time of the report, the project had been dropped.

P55/R1099 876
Specification for Model NL-130 hydrophone and mount. Columbia Univ. - Div. of War Research
Sept. 4, 1944 16p.

This specification covers the manufacturing requirements for the Model NL-130 hydrophone and mount. The NL-130 hydrophone consists of a 5 3/4 in. straight toroidally wound permanent-magnet magnetostrictive hydrophone unit encased in plastic and covered with a synthetic rubber sheath. Its length is 10 in., its diameter is 2-1/2 in., and its weight is 2 lb. The hydrophone is designed to withstand the shocks, abrasion, and general wear encountered in normal service. The hydrophone unit is installed in a molded neoprene housing which is attached to a 1/4-in. thick steel bed plate.

P60/R1100 877
Preliminary installation, operation, and maintenance instructions for the torpedo-detection modification of the WCA-2 echo ranging-listening-sounding equipment. Columbia Univ. - Div. of War Research
Sept. 1, 1944 v.p.

The torpedo-detection modification is applied to the QB side of the WCA-2 echo ranging-listening-sounding equipment to aid a surfaced submarine in detecting an approaching torpedo and determining its bearings in time to permit evasive maneuvers. This modification consists principally of providing for continuous rotation from 4 to 12-1/2 rpm, and the addition of a modified Sangamo recorder to record the relative bearings of torpedoes thus detected. The instructions for this modification are given.

D16/R1101 878
MACLAUGHLIN, R. R. and VAN LENNEP, D.
W.

Tests on six M-7/CRT-1A
hydrophones (series 5).
Columbia Univ. - Div. of War
Research
Aug. 30, 1944 9p.

Tests have been made on six units
of the initial production of the
5-in. by 3-in. toroidally wound ERSB
hydrophones manufactured by Rola
Corporation. Acoustic calibrations
were made on BARGE on the units as
received, and also after applying a
wetting agent and remagnetizing, as a
means of checking on the manufacturer
in these respects. The performance
characteristics of each unit are
shown on the curve sheets. The
measured values of insulation
resistance to sea water were 50,000
ohms or more. The constructional
features appeared to conform to the
specifications, except for the tape
ties.

D24/R1102 879
MACLAUGHLIN, R. R. and VAN LENNEP, D.
W.

Tests on Buna S baffle blanket.
Columbia Univ. - Div. of War
Research
Aug. 31, 1944 4p.

This memorandum covers the
results of tests on a prefabricated
Buna S baffle blanket constructed
according to the included drawing.
For purposes of tests, the blanket
was applied to a standard NL-109 type
baffle casting. The frequency-
response characteristics, front and
back, of a JP-1 hydrophone mounted in
the assembled baffle are shown in
figure 1. The performance is in line
with expectations and is generally
comparable with or slightly superior
to that of the production neoprene
blankets which it is to replace.

D16/R1103 880
MACLAUGHLIN, R. R. and VAN LENNEP, D.
W.

Evaluation of annealing, V.
Columbia Univ. - Div. of War
Research
Aug. 31, 1944 12p.

This memorandum covers the
results of tests made on samples of
nickel tubing, 3 in. in diameter,
with a wall thickness of 0.035 in.,
produced and annealed by the
International Nickel Company in
connection with shipments to the
Astatic Corporation and Freed Radio
Corporation for use in the
construction of the M-7/CRT-1A
hydrophone. The tests are described
and the acoustic-response
characteristics are shown in figure 1.

D16/R1104 881
MACLAUGHLIN, R. R. and VAN LENNEP, D.
W.

Tests on 12 M-7/CRT-1A
hydrophones, series 6.
Columbia Univ. - Div. of War
Research
Aug. 31, 1944 15p.

Tests have been made on 12 units
of the initial production of the 5
in. by 3 in. straight toroidally
wound ERSB hydrophones manufactured
by the Rola Corporation. The tests
were made after the buoys, which had
been supplied complete with
hydrophone, had been drop tested.
Acoustic calibrations were made on
BARGE on the units as retrieved, and
again after remagnetization. The
performance characteristics of each
unit after remagnetization are shown
on curve sheets.

D16/R1105 882
MACLAUGHLIN, R. R. and VAN LENNEP, D.
W.

Tests on 12 M-7/CRT-1A
hydrophones, series 4.
Columbia Univ. - Div. of War
Research
Aug. 30, 1944 13p.

This memorandum covers tests made on 12 units of the initial production of the 5 in. by 3 in. toroidally wound ERSB hydrophones manufactured by the Astatic Corporation. The tests were made after the buoys, which had been supplied complete with hydrophones by the Emerson Radio and Phonograph Corp., had been drop tested. Acoustic calibrations were made on BARGE before and after remagnetization. The measured values of insulation resistance to sea water varied from 600 ohms to several megohms, which is satisfactory for the operation of the hydrophone. The constructional features appeared to conform to the specifications, except that the tubes had not been painted.

P55/R1106 883
SNOW, W. B.
Modifications to submarine noise-level monitor.
Columbia Univ. - Div. of War Research
Aug. 31, 1944 4p.

Modifications that will be made to the submarine noise-level monitor are discussed in this memorandum. Drawings are included that show the modifications in detail.

P47/R1108 884
Specification for IS-WAS Animated Trainer, Mk I Mod I.
Columbia Univ. - Div. of War Research
Sep. 4, 1944 10p.

This specification covers the manufacturing requirements for IS-WAS Animated Trainer, Mk I Mod I. The IS-WAS animated trainer is a device for use in a slide projector to project images of the dials of the attack-course finder (IS-WAS) on a screen for instruction purposes. It is so constructed that the images of the dials can be rotated with respect to each other and to the image of an outer fixed dial in a manner similar to the rotation of the dials of an actual IS-WAS.

D55/R1109 885
Preliminary specification for the NL-122B sound-absorbing coupler of the D55 sonar system.
Columbia Univ. - Div. of War Research
Sept. 4, 1944 6p.

This specification covers the manufacturing and performance requirements of the NL-122B sound-absorbing coupler. This sound-absorbing coupler is installed between the JP-1 training shaft and the hydrophone for the purpose of absorbing mechanical vibration. Numerous drawings are included, along with a parts list.

D50/R1110 886
VAN LENNEP, D. W.
Tests on six NL-130 hydrophones.
Columbia Univ. - Div. of War Research
Sept. 4, 1944 8p.

Tests have been completed on six NL-130 hydrophones. Table I shows the DC resistance and 1000-cycle inductance of the completed hydrophones without cables. Acoustic calibrations of all units were made on BARGE and the response characteristics are shown in figures 1 to 6. The results of the tests indicate that the hydrophones are acceptable and satisfactory for service.

D34/R1111 887
RIPKEN, J. F.
TBF flight test of D34 top-end assemblies.
Columbia Univ. - Div. of War Research
Sept. 5, 1944 6p.

This memorandum summarizes the results of TBF flight tests made on August 22 and 24, 1944, of four dummy D34 units equipped with Detroit Wax Paper Co. parachute caps and a New London type parachute pack.

A30/R1112 888
PETIT, F. W.

Synchro test unit, unit no. 4136.
Columbia Univ. - Div. of War
Research
Oct. 25, 1944 8p.

The synchro test unit was made initially to facilitate checking and setting the synchros in the speed halving unit for TDC, but would be of value wherever synchros must be checked for electrical zero and positioned quickly and accurately. The test unit has been loaned to the manufacturer for use during the assembly of the speed halving units. When care is used to set the synchros as accurately as the test unit is capable of indicating the speed halving unit can be installed, wired, and put in service without further adjustments being necessary. The test unit consists of a 1F synchro, as an indicator, with a pointer and dial, a check switch, a zeroing transformer, two test switches, terminals, and a line switch, assembled in a case for portability.

P29/R1113 889
HORTON, J. W.

Proposed program for further work on submarine echo ranging.
Columbia Univ. - Div. of War
Research
Sept. 6, 1944 14p.

The purpose of this memorandum is to review the present situation concerning the basic requirements of submarine echo-ranging equipment and the performance obtainable with equipment in present use to summarize the results of recent investigations and to propose a program for the modification of installations now on our submarines.

D55/R1114 890
SAWYER, O. E.

Report of conference at
Portsmouth Navy Yard, August 31, 1944.
Columbia Univ. - Div. of War
Research
Sept. 5, 1944 2p.

This memorandum summarizes the more important discussions during a visit to the Portsmouth Navy Yard. The purpose of the visit was to decide on locations for the D-55 components on USS THORNBAC (SS-418), on which RCA pilot model #2 is to be installed, and other boats of the same class.

P55/R1115 891
SNOW, W. B.

JP-1 versus QB/JK for cavitation indication.
Columbia Univ. - Div. of War
Research
Oct. 4, 1944 9p.

This memorandum compares JP-1 equipment to QB/JK equipment. Noise levels measured through the QB equipment of two submarines are given. Calibrations are included whenever possible. Figures are included, showing the curves.

P39/R1116 892

Preliminary installation, adjustment, and maintenance instructions for recorder projector assembly Navy type RQ-10310.
Columbia Univ. Div. of War
Research
Sept. 29, 1944 v.p.

The recorder-projector assembly is a classroom demonstrator designed for the purpose of instructing groups of students in the operation of the sound-range recorder. It makes possible the demonstration of various types of sound-range recorder problems and the solution of these problems before the class. The assembly consists of two units: a screen and analyzer mechanism, Navy Type RQ-10307, and a trace projector, Navy Type RQ-10308. This projector throws the image of the sound-range recorder trace on the screen. A sound-range recorder, Navy Type CAN-55131, is used in conjunction with the trace projector and supplies the moving trace for the projector.

This recorder is not provided with the assembly.

G12/R1117 893
HARRIS, W. T.; EDWARDS, P. B.; and
VAN LENNEP, D. W.

A 12-in. by 12-in. square
magnetostriction transducer.
Columbia Univ. - Div. of War
Research
Sept. 7, 1944 13p.

A transducer with a 12-in. square
active face has been constructed and
tested. Frequency-response
characteristics are given in
figures. Other figures show the
projector characteristics, impedance
characteristics, and directivity
characteristics.

D12A/R1118 894
HOFF, H. B.

Recommended calibration of Block
Island cable system.
Columbia Univ. - Div. of War
Research
Sept. 7, 1944 20p.

This memorandum is an outline of
a calibration program for the Block
Island Cable-Connected Hydrophone
System. Numerous figures are
attached.

G27/R1119 895
THURAS, A. L.

Experimental 2V Permendur
transducer A-74.
Columbia Univ. - Div. of War
Research
Oct. 25, 1944 6p.

The purpose of constructing this
transducer was to determine by
experiment the possibility of
obtaining a permanent-magnet type
underwater loudspeaker made of
Permendur. Calculations were made to
determine the maximum amplifier power
that can be used to drive the
Permendur without loss of
magnetization.

A30/R1120
PETIT, F. W.

896

Vernier dial for DRAI Unit No.
4017.
Columbia Univ. - Div. of War
Research
Sept. 11, 1944 8p.

The DRAI indicates continuously
on dials the ship's present position
in latitude and longitude (degrees
and minutes), computed by dead
reckoning. The total distance
traveled by the ship, regardless of
course, is also indicated on an
odometer (miles). The DRAI receives,
through synchros, the heading input
(angle) from the ship's gyro and the
distance input from the underwater
log (as revolutions proportional to
miles) and analyzes the distance into
two components at right angles, one
north-south and the other east-west,
and converts these components into
degrees and minutes of latitude and
longitude. The standard dial for
this equipment was compared to the
Vernier dial.

D53/R1121 897
LOYE, D. P. and PROUDFOOT, D. A.

Proposed submarine-machinery
noise-reduction program.
Columbia Univ. - Div. of War Research
Sept. 9, 1944 10p.

To adequately quiet submarines, a
long-range program is required. In
the program outlined herein, it is
contemplated that NDRC will take
primary responsibility for the
planning and testing for
approximately the first 6 months, or
less, depending on the speed with
which a program can be established.
After this period, NDRC will act in a
consulting capacity.

D55/R1122 898
CALLEN, R. J.

Visit to RCA Victor,
Indianapolis, IN, July 25 to
September 2, 1944.
Columbia Univ. - Div. of War
Research
Sept. 9, 1944 2p.

The purpose of the visit was to
supervise the construction of two
CUDWR D-55 pilot model RLI systems
built by RCA using CUDWR components
and drawings and to aid in the
engineering and design of RCA D-55
units.

P33/R1123 899
SNOW, W. B.

Detection-range calculations, USS
CAVALLA.
Columbia Univ. - Div. of War
Research
Sept. 11, 1944 4p.

A set of analyses has been made
of the noises of the auxiliaries of
the submarine USS CAVALLA. The
method was to analyze, in 5-cycle
bands, the output of phonograph
records which had been recorded using
a hydrophone about 50 ft from the
submarine resting on the bottom on
the regular sound range in Gardiner's
Bay. This memorandum gives the
results of calculations of the
maximum detection range to be
expected as a result of operating
certain of these auxiliaries.

G12/R1125 900
THURAS, A. L.

Five-foot split JP-1 type
permanent magnet hydrophone TMS 97.
Columbia Univ. - Div. of War
Research
Sept. 14, 1944 4p.

A 5-ft straight hydrophone,
TMS 97, has been developed by the
Transducer Group. Instead of the
standard laminated-silicon core of
the JP-1 hydrophone, the unit has two

split windings on two solid remalloy
cores, which have dimensions of
approximately 3/16-in. by 2-in. by
27-in. The cores are wound with 160
turns of #22 formex wire. The nickel
tube was heat treated at 1550°F for
1 hr. The hydrophone was clamped in
butyl resistance rubber.

P60/R1126 901
HOFF, H. B.; BERRY, A. M.; and
ALLEMAN, R. S.

Estimated torpedo-detection
ranges on QB unit with 755 receiver.
Columbia University - Div. of War
Research
Sept. 15, 1944 16p.

This memorandum presents the
results of calculations of average
torpedo-detection ranges at 24 kc to
be expected on submarine QB gear
using a 755-type receiver. The
computed ranges were based on the
average measured 24-kc levels of
various torpedoes, measured in
connection with the merchant vessel
protection program, and on surface
self-noise measurements at various
speeds, made on the WCA-2 equipment
on USS CAIMAN on August 8, 1944, by
engineers from the New London
Laboratory. The procedure used in
estimating average ranges consisted
of determining the difference between
the average spectrum level at 100 yd
at 24 kc of the torpedo being
considered and the 24-kc self-noise
spectrum level of the submarine at a
given relative bearing and, then,
determining the range at which the
torpedo noise just equals the
self-noise of the submarine. In this
procedure, a transmission loss
consisting of a 6 dB per-distance-
doubled divergence loss plus an
attenuation of 3.6 dB per kyd was
used.

G12/R1127 902
THURAS, A. L.
Operation of topside sonic gear
on USS BLUEBACK.
Columbia Univ. - Div. of War
Research
Sept. 18, 1944 5p.

This report describes the
topside sonic-gear installation on
USS BLUEBACK. This is a standard
JP-1 installation, except for the
hydrophone, a special switch box,
and a visual indicator. Attached
to this report is figure 1, which
shows explanatory curves of the
response characteristics of the
hydrophone. Sketch SK6109 shows
the schematic circuit of the switch
box. Sketch SK6110 is a schematic
diagram of the visual indicator.

D24/R1128 903
SNOW, W. B.
Permoflux headset for JP series
equipment.
Columbia Univ. - Div. of War
Research.
Sept. 14, 1944 2p.

This memorandum describes two
sample headset assemblies which are
to be furnished in the future on JP
series submarine equipment and
modifications thereof. The headset
is shown in an attached
photograph. It consists of a
headband with clips, which will
properly fit a headphone equipped
with the large Harvard-design ear
cushion, two Permoflux PDR-8
extended-range headphones, equipped
with these ear cushions, and a 5-ft
cord with a normal length phone
plug at one end and the most modern
type of cord-tip connectors at the
other.

D55/R1129 904
SAWYER, O. E.
Report of conference at
Portsmouth Navy Yard, September 8,
1944.
Columbia Univ. - Div. of War
Research
Sept. 18, 1944 2p.

This memorandum summarizes the
more important discussions during a
visit to the Portsmouth Navy Yard
on September 8, 1944. The purpose
of the visit was to iron out minor
differences preparatory to the
installation of D55 equipment on
USS THORNBAC (SS-418). A list of
changes to be made are given.

D55/R1130 905
Preliminary specification for
the NL-129-A hydrophone baffle of
the D55 sonar system.
Columbia Univ. - Div. of War
Research
Sept. 18, 1944 4p.

This specification covers the
mechanical and performance
requirements of the NL-129-A
hydrophone baffle. The NL-129-A
hydrophone baffle is designed for
supporting the NL-124 hydrophone
and for imparting certain
directional qualities to the
hydrophone. The baffle consists of
an assembly of sturdy stainless
sheet steel (#304) stampings
forming a hollow streamlined
fairing, having a recess for
holding the hydrophone in place and
covered with a rubber blanket of
special construction and
composition.

D55/R1131 906
HAEFNER, S. J.
Tests of Exp. 199 SPL., Exp.
196a. and Exp. 1976 CTC
transformers.
Columbia Univ. - Div. of War
Research
Sept. 13, 1944 2p.

Three input transformers manufactured by the Chicago Transformer Company have been tested. The transformer identified as Exp. 199 SPL was compared with our 16516-BE transformer. In figure 1 are compared the frequency responses of the two transformers using an H-169 hydrophone for the generator impedance. The results indicate that the transformer is acceptable.

P55/R1132 907
Specification for Model NL-132 noise-level monitor adapter. Columbia Univ. - Div. of War Research
Sept. 21, 1944 17p.

This specification covers the manufacturing requirements for a Model NL-132 noise-level monitor adapter. The Model NL-132 adapter is to be used in connection with JP series submarine sound-listening equipment. The adapter provides a means for connecting any one of several hydrophones to the JP amplifier to measure the amplitude of the signals generated in the hydrophone by noises in the ship. The adapter unit consists of an L-shaped steel box that is to be installed on the left front of the JP amplifier panel, as shown in photograph No. N-2948. The panel of the unit carries a six-position selector switch, a decibel meter, a fuse holder, a hydrophone-magnetizing switch, a pilot light, and a decibel-meter push-button switch. Provision is also made for transfer of the power-supply switch from the JP amplifier to the panel of the adapter unit when it is installed. A double-throw switch and five connecting jacks are mounted on the ends of the chassis.

P55/R1133 908
Specification for Model NL-142 sound-level meter. Columbia Univ. - Div. of War Research
Sept. 21, 1944 6p.

This specification covers the manufacturing requirements for a Model NL-142 sound-level meter. The Model NL-142 sound-level meter is to be used in connection with Model NL-132 noise-level monitor adapter to measure the amplitude of incoming signals. It consists of a decibel-meter mounted on the cover of a steel box, a bracket for mounting the box at a remote location, and a cable with plugs for connecting to the adapter unit.

D53/R1134 909
PRATT, R. W.
Overside measurements of port propeller-shaft howl, USS BLUEBACK (SS-326). Columbia Univ. - Div. of War Research.
Sept. 20, 1944 2p.

Overside measurements of the USS BLUEBACK were made September 7, 1944 at about 1500, by Navy personnel of the Electric Boat Company at the outside dock of the main yard. The purpose of the test was to determine the major source of port propeller-shaft howl. The results of the tests are given in tabular form.

D53/R1135 910
SCHULZE, R. C. R. and WAGNER, R. A.
Reduction gear noise tests on USS BLENNY (SS-324). Columbia Univ. - Div. of War Research.
Sept. 20, 1944 3p.

A visit was made to the Electric Boat Company for two purposes: (1) to take measurements of noise due to the reduction gears

on USS BLENNY, and (2) to show Navy and EB Company personnel how to operate their new OAY sound-measuring equipment. The demonstration of the OAY equipment proceeded satisfactorily. Three series of tests were run on the reduction gears of USS BLENNY. Two tables are included.

D55/R1136 911
CALLEN, R. J.

Discussion of test equipment for the right-left indicator in the D-55 system.
Columbia Univ. - Div. of War Research.
Sept. 20, 1944 3p.

This memorandum covers a meeting held to discuss the test equipment required for testing of the Right-Left Indicator which is part of the D-55-JP-1 modification equipment. The units and test sets are described.

TG12/R1137 912
THURAS, A. L.

Magnetostriction hydrophone design.
Columbia Univ. - Div. of War Research.
Sep. 21, 1944 5p.

A new type of hydrophone has been designed in which a circular nickel tube has been formed into a hexagonal nickel tube by means of an internal structure. Physically, it is apparent that the hexagonal tube is less stiff than the circular tube. Consequently, for a given external pressure the hexagonal tube will have a greater internal strain than the circular tube. Since the magnetic flux and voltage generated in the winding due to magnetostrictive effect are directly proportional to the strain, the hexagonal hydrophone will be more sensitive and efficient than the circular

hydrophone. Theory shows that, other things being equal, the sensitivity and efficiency of the hydrophone below resonance varies directly as $(r_1/r_2)^4$, where r_1 is the radius of curvature of the sides of the hexagonal tube and r_2 is the radius of curvature of the circular tube. If the radius of curvature of the hexagonal tube is twice the radius of curvature of the circular tube, the efficiency of the hexagonal tube will be 12 dB higher than that of the circular tube.

P35/R1138 913
ARCHER, G. W.; HERRNFELD, F. P.;
and KROENERT, J. T.

Underwater sound-measuring system developed and used at the New London Laboratory.
Columbia Univ. - Div. of War Research.
Dec. 7, 1944 v.p.

This report describes the sound-measuring system, developed by the Electronics Group at the request of W. B. Snow, used for routine equipment testing at the New London Laboratory. Many photographs are included.

D55/R1139 914
GONGWER, C. A.

Report of visit to RCA Victor Division, Indianapolis, IN.
Columbia Univ. - Div. of War Research.
Sept. 21, 1944 2p.

This memorandum describes a visit to RCA Victor Division for the purpose of discussing details of the D55 power drives.

D16/R1140

915

CLEARWATERS, W. L.

Tests on production samples of Real Silk Hosiery Company parachutes for AN/CRT-1A units. Columbia Univ. - Div. of War Research. Sept. 20, 1944 3p.

This memorandum covers the tests made on the production samples of the Real Silk Hosiery Company parachutes for the AN/CRT-1A buoys. The tests were conducted on 18 September 1944, the drops being made from the bomb bay of a TBF aircraft under simulated operational conditions. The Real Silk parachutes operated satisfactorily on the test drops and it is concluded that these parachutes are comparable with those now being used on the AN/CRT-1A buoys.

D34/R1141

916

CLEARWATERS, W. L.

Test on top section of DRSB. Columbia Univ. - Div. of War Research. Sept. 21, 1944 3p.

This memorandum covers a test of the top section of the DRSB made on 18 September 1944. The primary purpose of the test was to determine the usefulness of the proposed A. P. Company dye pack for present production units. Tests were also carried out on a proposed 8-ft static-line stowage cup and a proposed nylon parachute. Four dummy DRSBs with complete top-cap assemblies and antennae were dropped from a PBV for these tests. It was found that the proposed A. P. Company dye pack was not satisfactory. The tests showed the 8-ft static-line stowage cup and nylon parachute to be satisfactory for use on the DRSB.

It was also observed that two antennae had pulled out the aluminum rivets at their base. One static line was sheared by the sharp-edged hole of the bakelite washer under the stowage cup. The A. P. Company has been notified of the failures of the dye packs and proposed improvements are being made. The antennae rivets being used in the present production DRSB are brass, instead of aluminum, and breakage of the brass rivets is not anticipated. The bakelite washer is not being used in the present production, but when these washers are used the sharp cutting edges will be removed.

P52/R1142

917

Appendices for report on training activities (1) expendable radio sono buoy, and (2) directional radio sono buoy, April 1 to September 1, 1944. Columbia Univ. - Div. of War Research. Sept. 25, 1944 v.p.

This report outlines the training activities of instructors for expendable radio sono buoys and directional radio sono buoys. The ERSB instructor's course is described, as is the ACG training program.

P60/R1143

918

WCA training records: a manual for the instructor. Columbia Univ. - Div. of War Research. N.D. 7p.

The WCA training records are recordings of underwater sound picked up by WCA equipment. The examples used are sounds that will actually be encountered when on sea patrol. Supplementing the sound examples on the records are instructions for the operation of the WCA gear, covering such subjects as search procedure,

contact procedure, echo ranging, and getting a turn count. The records were made to help instructors train sonar operators.

D55/R1144 919
REED, F. C.

Graphical evaluation of the effect on RLI accuracy of an interfering signal, and a study of the relative merits of the 2-section, 5-ft hydrophone versus the 10-section, P. M., 5-foot lobe-reduction hydrophone from an interference viewpoint, frontal lobe section only.

Columbia Univ. - Div. of War Research.
Sept. 22, 1944 15p.

This report summarizes and discusses the effect on RLI accuracy of an interfering signal. Graphic solutions and plots are included in the report.

D16/R1145 920
SUTER, H.

ERSB tests made from surface vessels at Casco Bay, ME, July 14 and 18, 1944, and Key West, FL, July 26 to August 1, 1944.

Columbia Univ. - Div. of War Research.
Sept. 23, 1944 12p.

This memorandum describes tests made using ERSB equipment at Casco Bay, ME, July 14 and 18 and at Key West, FL, during the period from July 26 to August 1, 1944. In these tests, submarine sounds were transmitted to various types of surface craft which were equipped with radio receivers. In the Casco Bay tests, a pattern of buoys were dropped by an airplane. A submerged submarine operated within the pattern at any depths and speeds while a division of five receiver-equipped DE's ran in from distances of about 10 miles away from the pattern. Using submarine

signals picked up by the buoys, each DE's course was set to pass as close as possible to the submarine, where the snip's echo-ranging equipment was used to determine the submarine's exact location.

Similar tests were made at Key West. In addition, the ranges at which sounds of various types of craft masked those of the submarine were determined. The radio range versus relative-bearing pattern was determined for all antenna installations on the ships. The effect of depth charges exploding in the vicinity of buoys was also investigated.

D50/R1146 921
SNOW, W. B.

Conference on oceanographic factors affecting DCDI range indicators.

Columbia Univ. - Div. of War Research.
Sept. 23, 1944 3p.

This memorandum relates the discussions at a conference called on calibrating the DCDI range-indication meter and the effects of oceanographic conditions on this indicator.

P40/R1147 922
GILLET, G. D.

Conning-officer attack teacher. Columbia Univ. - Div. of War Research
Sept. 23, 1944 v.p.

The equipment described in this report is essentially a modernization of the Mark I attack teacher. The modernization is so complete that only the track, periscope, and simulated conning tower of the present Mark I units are utilized in the new equipment. Many photographs and plans are included.

D55/R1148
HAEFNER, S. J.

923

Impedance characteristics of Exp. 197, Exp. 199, Exp. 199 SPL, and Exp. 200 SPL, and frequency response of Exp. 200 SPL, CTC transformers.
Columbia Univ. - Div. of War Research
Sept. 25, 1944 4p.

The impedance versus frequency characteristics of three input transformers manufactured by the Chicago Transformer Company and identified as Exp. 199, Exp. 199 SPL and Exp. 200 SPL are shown in figure 1. The Exp. 200 SPL transformer has a parallel resonance at approximately 45 kc, which accounts for the dip in its frequency response curve shown in figure 2. The response curve does not compare favorably with that of our 16516 BE transformer. The impedances of transformers Exp. 197 and the 16712 BE compare favorably, as shown in figure 3.

P33/R1149
HARRISON, M. and MANINGER, R. C.

924

Some remarks on possible systems of airplane detection.
Columbia Univ. - Div. of War Research
Sept. 29, 1944 13p.

This memorandum describes some features of two possible systems for extending the range of airplane detection. The two systems are compared and the directivity patterns are included.

D55/R1150
KNUDSON, W. T. and STRADLING, L. J.

925

Sound-level comparison of five amplidyne motor-generator sets operating under normal full-load conditions.
Columbia Univ. - Div. of War Research
Sept. 28, 1944 4p.

This report confirms discussions with Mr. O. E. Sawyer and others relative to the noise-comparison tests of five amplidyne motor-generator sets (used on D-55 sonar modification), mounted on Lurd (200 PHN-45) mounts, resting on the floor of the sound-proof room. Also, one of the units was later installed in a specially constructed sound-proof box and the test was repeated. The noise was measured and analyzed with a W. E. 633-A microphone, ERPI RA-277 sound analyzer, and a Sound Apparatus Company recorder.

D53/R1151
LOYE, D. P. and STRADLING, L. J.

926

Noise measurements and analyses of the USS SPIKEFISH (SS-404).
Columbia Univ. - Div. of War Research
Oct. 17, 1944 5p.

Noise and vibration measurements were made on USS SPIKEFISH August 25, 1944. The noise-level measurements were made while underway on the Navy sound range in Gardiner's Bay and indicated that the noise output at 40 rpm was 86 dB, at a range of 200 ft. The principal noise under this operating condition was attributable to gear noise, and it was decided to try remedial measures in connection with modifications scheduled to be made at Portsmouth Navy Yard. Analyses of the noise conditions were made before and after modifications and are presented in three figures.

D57/R1152
BUSH, W. M. and ALLEMAN, R. S.

927

Correction of ping transient of WCA-2 QB driver.
Columbia Univ. - Div. of War Research
Sept. 26, 1944 4p.

Modifications have been made to correct ping transient. This modification allows a charge to build up in condensor C-1401 during the long receiving interval, rather than during the short ping interval. The original condition puts a heavy drain on the driver power supply during the ping. This modification is necessary if maximum power is to be obtained on short-ping echo ranging, and it improves the frequency-sweep operation.

P55/R1153 928
SNOW, W. B.
Noise-level monitor
modifications.
Columbia Univ. - Div. of War
Research
Sept. 29, 1944 2p.

This memorandum records the decisions reached regarding the final plans for the submarine noise-level monitor modification. The modifications are listed and described.

P60/R1154 929
ALLEMAN, R. S. and BUSH, W. M.
Correction to WCA-2 preliminary
instruction book on QB driver
adjustment.
Columbia Univ. - Div. of War
Research
Sept. 29, 1944 1p.

This memorandum suggests a correction to be made in the WCA-2 preliminary instruction book. The correction affects the QB driver.

D53/R1155 930
SNOW, W. B.
Methods for calculating
correction factor for the RQ 51055
hydrophone.
Columbia Univ. - Div. of War
Research
Oct. 21, 1944 3p.

Various methods for calculating the correction factor are given and compared in this memorandum. Specific procedure recommendations are made.

P40/R1156 931
Preliminary installation,
operation, and maintenance
instructions for the conning
officer attack teacher (C.O.A.T.).
Columbia Univ. - Div. of War
Research
Feb. 15, 1945 v.p.

This is a manual which describes the equipment and how to use it. The conning officer attack teacher (C.O.A.T.) is used for the instruction of student officers, approach officers, and fire-control parties of submarines. It makes possible a reproduction in the classroom of the conditions of a submarine attack from the instant the enemy ship or convoy is sighted until the torpedoes are fired.

P50/R1157 932
HANSON, R. O. and SAARS, W. F.
Loudspeaker frequency-response
measurements.
Columbia Univ. - Div. of War
Research
Sept. 30, 1944 12p.

It has been found during the recent modification of Presto Model L-3 that the response of the PM8-C loudspeaker was inadequate between 5 and 10 kc, and it would require replacement. With the purpose in mind of providing information regarding speaker response characteristics to supplement comparative listening tests, a calibration of all the various loudspeakers commonly used in the Recording Department were undertaken. The tests were made using the BARGE calibrating system and the procedures of the test are

described. A list of speakers calibrated is included and performance characteristics are given.

D16/R1158 933
SUTER, H.

Conference held at Norfolk, VA, on September 14, 1944, regarding AN/CRT-1A failures.
Columbia Univ. - Div. of War Research
Sept. 29, 1944 1p.

On September 14, 1944, a conference was held at the ERSB Division of COMAIRLANT Gunnery at Norfolk, VA to determine means for overcoming certain difficulties which have been encountered with the AN/CRT-1A units recently received from the manufacturers.

60/R1159 934
ALLEMAN, R. S.

Conjectures as to origin of observed supersonic noise on surfaced submarines.
Columbia Univ. - Div. of War Research
Sept. 30, 1944 1p.

Supersonic noise levels of a surfaced submarine are peculiar in two respects: (1) the extremely rapid rise in level between 8 and 12 knots, some 34 dB at 24 kc; and (2) the extremely broad beam patterns, which have no resemblance to those obtained for a point source or plane waves; the 10 dB points are ± 10 deg. in the latter but $\pm 75^\circ$ deg. in the former. It has been suggested that a dome around the QB head may help the situation, since it has been observed on surface craft that the dome can reduce the noise of the spherical projector by some 7 dB in changing speeds from 8 to 12 knots. It was also suggested that the noise may be the result of a critical speed of the submarine, at which the bow wave begins to break.

D34/R1160 935
RIPKEN, J. F.

PBY flight test of D34 top-end assemblies.
Columbia Univ. - Div. of War Research
Oct. 2, 1944 3p.

This memorandum summarizes the results of PBY flight tests made on August 28, 1944, on six dummy D34 units equipped with Detroit Wax Paper Company parachute storage cups and American Lady Corset Company parachute packs.

P33/R1161 936
THURAS, A. L.

Tests of an improved JP-1 type hydrophone on the USS BLUEBACK.
Columbia Univ. - Div. of War Research
Oct. 3, 1944 5p.

A total of three trips were made on September 16, 26, and 27, 1944 during the regular submarine trials. During the first trip (deep-dive test), performance of the equipment was discouraging because of an intense rattling (on bearing 172), bad sound conditions, and the lack of targets. On the return of the submarine, a number of loose parts on the superstructure were either secured or welded. On the second trip (deck-gun firing test), operation of the listening equipment was again discouraging because of the lack of targets and no reduction in the noise on bearing 172. On the third trip, the boat was given a sound-range test. Listening conditions in general were good and the submarine was quiet. The data taken during tests are given in tabular form.

D34/R1162 937
CLEARWATERS, W. L.

Test on top section of DRSB.
Columbia Univ. - Div. of War Research
Oct. 2, 1944 3p.

This memorandum covers a test of the top section of the DRSB made on 27 September 1944. The primary purpose was to determine the usefulness of the redesigned A. P. Company dye pack with reinforced edges and longer tabs. This was also a test of a complete top section, as will be used in the first production units, and of the brass antenna-holding rivets, used in this assembly to determine whether or not they would pull out when the top section pulled off. Four dummy DRSB's with complete top-cap assemblies and antennae were dropped from a PBV for these tests. It was found the redesigned A. P. Company dye pack was not satisfactory. The top sections worked very well and indicate that the operation of the production units should be satisfactory. The tests showed that the brass rivets holding the base of the antenna are strong enough to withstand the strain as the top section pulls off.

D55/R1163
SAWYER, C. R.

938

Report of conference at RCA, September 20 and 21, 1944.
Columbia Univ. - Div. of War Research
Oct. 2, 1944 6p.

This report discusses the decisions and some of the discussion in a conference on WCA conversion equipment held on September 20 and 21, 1944, at the RCA-Victor Manufacturing Co., Indianapolis, IN. The purpose of the conference was to review thoroughly the present status of the job, to determine whether there were any loose ends or misunderstandings as to the design, information, and requirements, and to determine whether any further steps could be taken to ensure the delivery of RCA pilot models 3, 4, and 5 and the production equipments, as scheduled, or with a minimum of delay.

D16/R1164

939

CLEARWATERS, W. L.

Tests of redesigned top sections for the ERSB.
Columbia Univ. - Div. of War Research
Oct. 31, 1944 2p.

This memorandum covers the results of tests on 20 October 1944 for the purpose of drop testing CUDWR redesigned top sections of the ERSB. Six buoys were dropped from the bomb bay of a TBF at speeds of 140 and 160 knots and at an altitude of 500 ft. The results of the tests are briefly outlined.

P60/R1165

940

Specification for slip-ring unit, collector gear, and recorder-keying-switch unit for QB gear in E.B. Co. submarines.
Columbia Univ. - Div. of War Research
Oct. 6, 1944 6p.

This specification covers the manufacturing requirements for the slip-ring unit, collector gear, and recorder-keying-switch unit for QB gear in E. B. Co. submarines. The slip-ring unit consists of two channeled rings having an outside diameter of 8-3/8 in. and held in three hard-rubber holder rings. Each ring and holder is split on a major diameter so that assembly can be made around a continuous shaft. The collector gear consists of gold-plated copper braid secured to a collector hook by means of helical springs and a stand that holds the collector blocks into which the hooks are fastened. The recorder-keying-switch unit consists of a Class 9007-P11-A Square-D limit switch mounted on a spacer block (18782-A) and secured to a mounting plate (19442-C). A keying pin (19780-A) and a pin adapter for the beveled-type azimuth dial (19782-A) are also required.

G27/R1166 941
HARRIS, W. T. and VAN LENNEP, D. W.
Funnel transducers.
Columbia Univ. - Div. of War
Research
Oct. 6, 1944 9p.

The transducer design described in this memorandum was worked out in the hope that it would meet demands for rugged submersible microphones and for hydrophones that are highly efficient at low frequencies. The construction is described and the characteristics are shown by use of graphs. It is concluded that the transducer design described in the report meets the requirements.

D34/R1167 942
Preliminary handbook of installation and maintenance instructions for radio receiving equipment, AN/ARR-16.
Columbia Univ. - Div. of War Research
Nov. 1, 1944 v.p.

The installation and maintenance of radio receiving equipment AN/ARR-16 is included in this handbook. Radio receiving equipment AN/ARR-16 is a 14-tube airborne superheterodyne receiver designed to receive frequency-modulated signals generated by radio transmitting equipment AN/CRT-4. It can also be used with the AN/CRT-1 and AN/CRT-1A units.

G12/R1168 943
HARRIS, W. T.; VAN LENNEP, D. W.;
and EDWARDS, P. B.

2V Permendur hydrophones.
Columbia Univ. - Div. of War Research
Oct. 6, 1944 10p.

An alloy, 2V Permendur, is examined in this memorandum to see if it can be used for self-polarized magnetostrictive transducers. Hydrophones were constructed, using this material, and tested. The results of the tests are included. It is concluded that 2V Permendur has characteristics that lead both to advantages and disadvantages for line hydrophone construction, as compared to Alnico, polarized annealed nickel, and could not be justified for use.

D34/R1169 944
Preliminary handbook of maintenance instructions for radio transmitting equipment AN/CRT-4 (XN-1).
Columbia Univ. - Div. of War Research
Nov. 15, 1944 103p.

Directional Radio Sono Buoy AN/CRT-4 (XN-1) is a self-contained miniature radio transmitter. This buoy, when launched from an aircraft into the water, not only detects the sounds of moving submarines but also transmits to an airplane the direction of the sound source from the buoy. This handbook details maintenance instructions for this equipment.

G12/R1177 945
HARRIS, W. T. and VAN LENNEP, D. W.
Visits to Astatic Corporation and RCA-Victor Division.
Columbia Univ. - Div. of War Research
Oct. 12, 1944 4p.

The visits were made for the purpose of inspection of NL-124 hydrophones. The main purposes of these conferences were (1) at Astatic Corporation to make sure that the method of assembly of the hydrophones was clear, and to agree on the inspection to be carried out

at Astatic, and (2) at RCA to ascertain whether their facilities were suitable for making acoustic sensitivity control tests.

D55/R1178 946
CALLEN, R. J.

Meeting with Mr. Frank Zerillo to discuss the manufacture of rubber components used in the D-55 system.

Columbia Univ. - Div. of War Research

Oct. 10, 1944 2p.

This memorandum discusses a meeting with Mr. Frank Zerillo, of the Zerillo Rubber Company, Brooklyn, NY, regarding the manufacture of the NL-122B hydrophone sound-absorbing coupler and rubber blankets for the NL-129A baffle. These are components of the D-55 system, which is to be supplied to the Navy by RCA-Victor Division. An agreeable delivery schedule resulted.

P35/R1179 947
HAEFNER, S. J. and CHIPMAN, L. E.

Dynamic characteristics of pentodes and grid-current effects in triodes and pentodes.

Columbia Univ. - Div. of War Research

Oct. 23, 1944 v.p.

This report describes the dynamic characteristics of pentodes and grid-current effects in triodes and pentodes. The dynamic characteristic of a pentode, in which a resistance load is inserted in the plate circuit, is of particular importance in the design of high signal-level resistance-coupled amplifiers. This characteristic will be found more convenient for calculations, when maximum output voltage is desired,

than the plate characteristics generally given in tube handbooks and the receiving tube characteristics at low plate and screen voltages.

D34/R1180 948
MASON, R. I.

Tests of production-model DRSB. Columbia Univ. - Div. of War Research

Oct. 12, 1944 4p.

This paper covers the analysis of inspections and of drop tests of production-model DRSB equipment made September 24, 1944. The purpose of the test was to check all the design features and assembly workmanship encompassed in these, the first production models. The results of each drop are detailed in the report with an outline of necessary corrections.

D34/R1181 949

Specification for Model NL-137 hydrophone magnetizer.

Columbia Univ. - Div. of War Research

Oct. 17, 1944 9p.

This specification outlines the Model NL-137 hydrophone magnetizer, which is used to magnetize magnetostrictive hydrophones. It consists of a cabinet containing three 67-1/2 V batteries, a voltmeter, a rotary snap switch, six electrolytic condensers, a resistor, and terminals to which the hydrophone is connected. Photos and a parts list are included, as well as drawings.

D34/R1182 950

Specification for Model NL-138 tuning test case.

Columbia Univ. - Div. of War Research

Oct. 17, 1944 5p.

This specification outlines the Model NL-138 tuning test case, which is used while tuning a certain radio transmitter. It consists of a casing, as furnished with the transmitter, modified by apertures cut therein to permit tuning the transmitter equipment when it is installed in the test case. Slots are provided in the bottom rim of the casing to clear a cord connecting the transmitter equipment to an external test circuit. Photos and drawings are included.

D34/R1183 951
Specification for Model NL-139 voltage injector.
Columbia Univ. - Div. of War Research
Oct. 17, 1944 9p.

This specification covers the manufacturing requirements for the Model NL-139 voltage injector. The device is used for testing radio-receiving equipment. It consists of a metal box containing a single flashlight cell, a potentiometer, a four-pole double-throw switch, meter terminals, and output terminals. Photos, parts lists, and drawings are included.

D34/R1184 952
Specification for Model NL-140 sound test box.
Columbia Univ. - Div. of War Research
Oct. 17, 1944 8p.

This specification covers the manufacturing requirements for the Model NL-140 sound test box. This unit is used to test the hydrophone section of the directional radio sono-buoy. Drawings, a parts list, and photos are included.

34/R1185 953
Specification for Model NL-141 tuning tool.
Columbia Univ. - Div. of War Research
Oct. 17, 1944 10p.

This specification covers the manufacturing requirements for a Model NL-141 tuning tool used for tuning and adjusting radio transmitting and receiving equipments. It is a screwdriver-type tool, having a tool-steel bit on the shaft end and a recessed bit of the same material on the handle end. A parts list and drawings are included.

D16/R1186 954
CLEARWATERS, W. L.
Tests of proposed ERSB top section.
Columbia Univ. - Div. of War Research
Oct. 16, 1944 4p.

This memorandum covers the tests made on 10 October 1944 of a proposed top section for the ERSB. Five drops were made from the bomb bay of a TBF at various speeds. The tests indicated the necessity of redesigning the top cover in certain respects. Photos are included.

D55/R1187 955
CALLEN, R. J.
Difference listening as an aid to the right-left indicator in the D-55 system.
Columbia Univ. - Div. of War Research
Oct. 17, 1944 5p.

Difference listening has been included in the right-left indicator of the D-55 system as a result of the theoretical considerations outlined in this memorandum and the experience of

trained and untrained Navy and civilian personnel who have been operating the equipment. Frequency curves are included.

D34/R1188 956
MASON, R. I.

Tests of production-model DRSB.
Columbia Univ. - Div. of War
Research
Oct. 16, 1944 3p.

This paper covers the drop tests of production-model DRSB equipment modified to correct the troubles experienced on September 24, 1944, and described in memorandum D34/R1180-948. Corrections were applied to four standard factory models as a result of the prior tests. These encompassed (1) limit travel stops on the upper shock mounts, (2) bracing of the chassis frame to give satisfactory rigidity, (3) strengthening of the hydrophone bracket assembly, and (4) elimination of the slack nylon loop next to the weight plate. Results of these drops indicated satisfactory performance with no major corrections causing delays in production.

D48/R1189 957
ROCKWELL, G. O.

The R-type fuze.
Columbia Univ. - Div. of War
Research
Dec. 11, 1944 9p.

In December, 1942, the CUDWR undertook the development of an electrical fuze for a special projectile. Important among the requirements are (1) it should arm through hydraulic pressure, (2) it should have a delayed-action feature, (3) it should be actuated after arming by any deceleration in the speed of the projectile, and (4) it should fit the projectile, which had already been designed. Models were constructed and the

first tests were conducted March 16, 1943, at Solomon's Island. Development work continued and additional tests were made at Morris Dam and Solomon's Island during June. A model, satisfactory to NDRC and the Bureau of Ordnance, was approved about June 15. Late in June, 1943, it was decided that a mechanical fuze, which had been developed concurrently with the electrical type, would be more suitable for the special application proposed. Therefore, development work on the electrical fuze ceased but complete drawings and models were prepared and are available for consideration if a need for this type of fuze should arise in the future.

P62/R1190 958

Specification for Model NL-143
detonating device.
Columbia Univ. - Div. of War
Research
Oct. 21, 1944 10p.

This specification covers the manufacturing requirements for the Model NL-143 detonating device, which is a deep-water bomb. It has a firing head that is actuated by water pressure, a sea cell that provides an electric current when flooded, a tail fin, a chamber for an electrically fired detonator, and chambers for the booster and main charges. Included are photos, a parts list, and drawings.

P55/R1191 959

How to operate the noise level
monitor and the cavitation
indicator.
Columbia Univ. - Div. of War
Research
Feb. 1, 1945 28p.

This manual outlines the operating instructions for the noise-level monitor, which is a device enabling one to tell, while on patrol, whether one's snip

is becoming quieter or noisier. If it is noisier, the NLM enables one to locate quickly the source of the increased noise. The cavitation indicator is a small metal box with three neon lamps that warn when cavitation occurs. It is installed in either the conning tower or the control room.

P55/R1191A 960

Instructions for the use of the cavitation indicator and the noise-level monitor for checking own-ship's noise in 10 minutes.

Columbia Univ. - Div. of War Research
N.D. v.p.

This publication replaces "How to Operate the Noise-Level Monitor and the Cavitation Indicator" (P55/R1191-959), dated 1 February 1945. The basic principles of operation remain the same. This new manual presents a simplified manner of obtaining and recording the NLM data.

P55/R1192 961

Preliminary installation and maintenance instructions for the noise-level monitor and cavitation indicator.

Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

This manual contains installation and maintenance instructions for the noise-level monitor and cavitation indicator, whose uses are explained in report numbers P55/R1191-959 and P55/R1191A-960. Drawings and photos are included.

P47/R1193 962

GILLET, G. D. and RUDELIIUS, N. W.
Animated trainers, BIAT, RBAT, IS-WAS-AT.

Columbia Univ. - Div. of War Research
Oct. 31, 1944 10p.

An animated trainer is a device in the form of a slide-projector demonstrator for use in classroom instruction. The component parts of the unit may be moved by the instructor to simulate the movement of the various dial components. Three different types of animated trainers have been designed. They are (1) the Bearing Indicator Animated Trainer (BIAT), which is used to demonstrate search, sweeping target, and other sonar operator procedures; (2) the Relative Bearing Animated Trainer (RBAT), for use in giving training in the reading and estimating of relative bearings; and (3) the IS-WAS Animated Trainer (IS-WAS-AT), which is used to teach the use of the IS-WAS unit. Seven of each type of animated trainer have been constructed and distributed, with associated handbooks, in accordance with instructions from Cominch. Manufacturing specifications have been prepared and forwarded to the Navy.

DI6/R1194 963
SUTER, H.

Type test, Freed AN/CRT-1A unit no. 11946.

Columbia Univ. - Div. of War Research
Oct. 17, 1944 2p.

One Freed-manufactured AN/CRT-1A unit, No. 11948, was received for test on Oct. 6, 1944. This unit was immediately tested for frequency of the carrier and was found to be approximately 200 kc low. Since this difficulty had been reported to exist on a large percentage of units examined at Norfolk, it was decided to check this transmitter at the Freed factory to determine the cause of the frequency shift. Results indicated that the shift was caused by moisture condensing on the transmitter chassis. Modifications of this, and other minor problems, were begun immediately.

P59/R1195 964
Text for submarine-sonar
operator's manual.
Columbia Univ. - Div. of War
Research
Oct. 17, 1944 v.p.

This manual is for temporary
use only and outlines in detail
operating instructions for sonar
operators.

G1/R1196 965
MARKHAM, J. J.
Lloyd-mirror effect on
broadband source.
Columbia Univ. - Div. of War
Research
Nov. 8, 1944 15p.

This report discusses the Lloyd-
mirror effect, which is known to be
important in single-frequency
transmission, and the broadband
sources used in place of those of a
single frequency. Comparisons of
the two are made, with curves
included.

P50/R1197 966
Preliminary instructor's manual
for the JP-1 training program.
Columbia Univ. - Div. of War
Research
Nov. 2, 1944 v.p.

This manual includes lesson
plans for the operation and
maintenance of JP-1 sonar-receiving
equipment. Training aids in the
forms of photos, diagrams, and
drawings are also included.

D34/R1198 967
CLEARWATERS, W. L.
DRSB bomb-bay door release.
Columbia Univ. - Div. of War
Research
Oct. 20, 1944 4p.

This memorandum covers the
results of two test drops of DRSB's
from the bomb-bay door of a TBF.
Further tests are necessary to
correct the difficulties
encountered and to prove the new
launching method attempted. The
bomb-bay door system was devised as
an automatic release system for the
DRSB from TBF aircraft where manual
launching is extremely difficult.
Photographs are included.

P63/R1199 968
GOURLEY, G. M.
Sonar-training barge for
COMSUBLANT.
Columbia Univ. - Div. of War
Research
Oct. 25, 1944 9p.

This memorandum discusses the
layout, construction, and fitting
out of a barge to be used as a
training installation for submarine-
sonar personnel. Photos and
diagrams are included.

D34/R1200 969
The directional radio sono buoy.
Columbia Univ. - Div. of War
Research
May 20, 1945 74p.

This completion report for the
DRSB (direction-indicating means
for the ERSB) includes the history
of the development, the pilot
production for CUDWR, the
production buoy, the type AN/ARR-16
receiver, the operation of the
equipment, and DRSB training
activities. Photos, diagrams, and
drawings are also included.

D57/R1201 970
HORTON, J. W.
Proposed program for
modification of submarine echo-
ranging equipment.
Columbia Univ. - Div. of War
Research
Oct. 31, 1944 28p.

This memorandum discusses studies of problems encountered in echo ranging from a submarine. It was believed that to make the performance of the echo-ranging equipment on the submarine more in accord with known requirements and operating limitations than is now the case, the following will be necessary: (1) the provision of the signal generator unit, (2) the replacement of the JK-QC projector by a 40-kc QB unit, and (3) the substitution of a new sound range recorder and a rearrangement of circuits. Diagrams and drawings are included.

D51/R1202

971

Submarine triangulation-listening-ranging project.
Columbia Univ. - Div. of War Research
Oct. 21, 1944 10p.

This brief status report discusses preliminary studies, started in August 1943, of a new triangulation-listening-ranging system and its inherent limitations. These limitations include (1) the short baseline (240 ft) between hydrophones, making possible the determination of range with probable accuracy only between the sectors 040-140 and 220-320; and (2) the accuracy of range determination depending on the ability to hold a target within plus or minus 0.25° deg. If such ranges were to approximate the figures provided as indicative of reasonable range determinations through the periscope, it is presumed that the proposed system must be as good as, or better than, periscope accuracy. In conclusion, it is the opinion of CUDWR that the Navy would be well advised to continue the development of the TLR system, either at this laboratory or elsewhere.

P55/R1203

972

HARRISON, M.

Some tests of the cavitation indicator on USS BOARFISH.
Columbia Univ. - Div. of War Research
Oct. 23, 1944 2p.

This memorandum discusses tests of the cavitation indicator (CI) conducted on USS BOARFISH at Newport, RI, on Oct. 10, 1944. The purpose of these tests was to determine a procedure for the operation of the CI. It was attempted to monitor the cavitation by use of the JP gear. This gear was ineffective because of mechanical interference from boat noise. The sources of the noise were the bridge seats, searchlight, and several minor unnamed braces.

D55/R1204

973

SAWYER, O. E. and GONGWER, C. A.
Visit to Mare Island Navy Yard in connection with proposed #55 installation.
Columbia Univ. - Div. of War Research
Oct. 26, 1944 4p.

This memorandum discusses the following at the Mare Island visit: (1) familiarization of the group with the D55 gear (known as the WCA conversion equipment); (2) inspection of submarines; and (3) a tentative decision on RCA pilot model #3 installation on a submarine and a determination of how the components should be located. Installation information on the following ships is given: USS SRRINGER (SS-414); USS PUFFER (SS-268); USS BALAO (SS-285); and the USS SPEARFISH (SS-190). This memorandum also refers to a visit to the Bethlehem Steel Co. Yard where the following ships were discussed: USS TAUTOG (SS-199); USS STURGEON (SS-187); USS TUNNY (SS-282); USS TINOSA (SS-283); USS BOWFIN (SS-287); and USS GATO (SS-212).

D19/R1205

974

GONGWER, C. A.

Submarine marker buoy.
Columbia Univ. - Div. of War
Research
Nov. 30, 1944 12p.

Early in 1942, engineers of the New London Laboratory concerned with the testing of anti-submarine attack aids reported the need for a marker buoy to mark continuously a submarine's position while the submarine was submerged and underway during anti-submarine attack training exercises. In March, 1942, the Mechanical Design Group proceeded with the development of a submarine marker buoy, primarily for the use of Laboratory engineers engaged in anti-submarine attack aid tests. However, on completion of successful trials of the first models, the Navy became interested in the use of the marker buoy in other submarine exercises.

Therefore, plans were made to construct additional units to be transferred to the Navy. Thirteen submarine marker buoys of wooden construction were built in the Laboratory shop. Four were expended in tests, seven were transferred to the Navy, and two have been in use by Laboratory engineers in test programs in which submarines have participated.

D53/R1206

975

PROUDFOOT, D. A. and TEAL, E. E.

Overside noise analyses of JP power-training mechanism and two dc-ac machines on USS CHUBB (SS-329).

Columbia Univ. - Div. of War
Research
Oct. 25, 1944 4p.

This memorandum discusses measurements made of the waterborne noise generated by the JP power-training mechanism on USS CHUBB

(SS-329). These measurements included analyses of the noise from two dc-ac motor-generators, as well as the noise from the JP training mechanism with and without a fixing spacing soundproof box over the amplidyne unit. Conclusions are based on consideration of previously measured values of ambient-noise levels in deep water.

D53/R1207

976

LOYE, D. P.

Proposed noise and vibration tests on USS CHUBB (SS-329).
Columbia Univ. - Div. of War
Research
Oct. 26, 1944 2p.

This memorandum provides an outline of proposed noise and vibration-velocity measurements on USS CHUBB.

D16/R1208

977

SUTER, H.

Type tests of Freed and Emerson AN/CRT-1A and AN/CRT-1B units drop tested October 20, 1944.
Columbia Univ. - Div. of War
Research
Oct. 26, 1944 3p.

Three AN/CRT-1B units of Emerson manufacture, and four AN/CRT-1A units of Freed manufacture, received during the week ending October 21, 1944, were inspected and tested in the Laboratory, and tested by dropping from a TBF (hatch launching) at the Southwest Ledge Lighthouse. These drops were observed from the lighthouse, and the electrical performance and the field strength were observed at the Laboratory. A list of drop-test results and Laboratory inspection results are included.

D55/R1209

978

SAWYER, O. E.

Visit to BuShips for discussion of WCA conversion equipment. Columbia Univ. - Div. of War Research
Oct. 26, 1944 4p.

This memorandum discusses changes found desirable by CUDWR from experience to date with the RCA pilot models, to determine which of these changes to include in future RCA units and the penalties in delivery time that would result in each case.

D34/R1210

979

CLEARWATERS, W. L.

DRSB bomb-bay door launching and dye-pack test. Columbia Univ. - Div. of War Research
Oct. 31, 1944 5p.

This memorandum covers a trial of 23 October 1944, to test an automatic launching system installed on the bomb-bay door of a TBF. These drops were also a test of the dye pack for the DRSB. A series of four drops, using dummy buoys, were made from the TBF at a speed of 140 knots and at an altitude of 500 ft. Further trials are necessary to determine the proper design of a dye pack for use in the top cap of the DRSB. The automatic launching system from the bomb-bay door of a TBF is very satisfactory. Tests must be made, however, using real buoys to determine the effect of the outside exposure on DRSB's. Photos are included.

D38/R1211

980

TEAL, E. E.

A method of removing the hydrophone on the through-the-null listening equipment without drydocking the ship. Columbia Univ. - Div. of War Research
Nov. 2, 1944 2p.

This report discusses a method for removing the hydrophone on the through-the-hull listening gear that has been tried and found to work satisfactorily. In this equipment, the training shaft operates through a well that extends above the water line, so that no precaution against entry of water is necessary when the shaft is removed. Removal of the hydrophone and shaft is facilitated by special equipment that allows it to be lowered from its well, caught by a loop of rope under the ship, and hauled up to the deck, where repairs are made. When the equipment has been repaired, it is put overboard and pulled back up into the well.

P52/R1212

981

Preliminary instruction manual, DRSB trainer. Columbia Univ. - Div. of War Research
Oct. 27, 1944 v.p.

This manual discusses the directional radio sono buoy trainer, which is designed to provide training in the use of the directional buoy receiver and associated airplane equipment. The trainer develops simulated target signals and recorded background noise, which are broadcast by FM transmitters, representing two buoys. The operator tunes his receiver, reads the target direction, counts propeller beats, and otherwise operates his equipment just as he would during an actual search. Since standard buoy receivers are used, the student's training may be either in a classroom or in an aircraft in flight. Included are tables, diagrams, and schematics.

D12/R1213

982

SNOW, W. B.; HOFF, H. B.; and
BERRY, A. M.

Cable-connected hydrophone
systems.

Columbia Univ. - Div. of War
Research

May 21, 1945 v.p.

Cable-connected hydrophone
systems constitute a major factor
in the protection of important
harbor approaches. The present
report describes the participation
of New London Laboratory personnel
in the design, installation, and
testing of cable-connected
hydrophone systems at Block Island,
RI, and Cape Henry, VA. From the
data and experience obtained on
these installations,
recommendations have been made to
the Navy regarding standard
equipment for cable-connected
hydrophone systems. Various
studies were made of the
transmission characteristics,
mechanical design, and the
performance of cable-connected
sonic harbor-defense systems.

P28/R1214

983

HOFF, H. B.; MARKHAM, J. J.; and
PERRY, G. R.

Oceanographic studies.

Columbia Univ. - Div. of War
Research

May 5, 1945 v.p.

This report summarizes the
oceanographic work done by members
of this Laboratory from its
inception to the end of 1944. Most
of this work was done by the
Oceanographic Group in the Analysis
Department, after it had been found
impracticable for each development
department to handle its own
oceanographic requirements. Thus,
in nearly all of its activities,
this group has operated as a
technical-service unit.

D46A/R1215

984

HOFF, H. B.; COLE, D. L.; and
WAGNER, R. A.

Ambient-noise survey, Miami
area, and the east coast of the
United States.

Columbia Univ. - Div. of War
Research

May 5, 1945 v.p.

This report describes the
measurement technique and the
results of an ambient-noise survey
conducted during the summer of 1943
in the waters adjacent to Florida,
the Bahama Islands, and the east
coast of the United States as far
north as Cape Charles, VA. The
survey included both acoustical and
oceanographic measurements. The
acoustical measurements of primary
interest were those of snapping
shrimp and other marine-life
sources of noise. The areas
surveyed were selected because of
the similarity of their
oceanographic conditions to those
of other areas of strategic and
tactical importance. The ambient-
noise measurements taken during
this survey are considered to be of
importance in problems associated
with mine warfare, harbor defense,
and the protection of our own
submarines in hostile waters.

P20/R1216

985

SNOW, W. B.; PROUDFOOT, U. A.; and
TEAL, E. E.

Merchant-vessel protection.

Columbia Univ. - Div. of War
Research

Nov. 30, 1944 18p.

This completion report
discusses the problem of merchant
vessels being held down to convoy
speeds of 10 to 12 knots, when they
could actually operate alone at 14
to 19 knots, if adequate protection
against torpedoes could be
provided. At a conference on this
subject, an evaluation of means of
providing

protection for merchant vessels against torpedo attack was discussed. At this meeting, two systems of detection, actually in use, were described. As a result of this conference, Section 6.1 of NDRC was asked to review its program on underwater sound and to make recommendations as to work it might carry out quickly to aid in the merchant-vessel protection program.

D34/R1217 986
MASON, R. I.

Tests of production-model DRSB, October 16, 1944.
Columbia Univ. - Div. of War Research
Nov. 1, 1944 2p.

This report covers the drop tests of four Emerson production-model DRSB's, with the following modifications: (1) limit-travel stops on upper shock mounts, (2) chassis bracing for rigidity, (3) strengthened hydrophone bracket assemblies, (4) nylon tension springs, (5) guard plate under motor spool, (6) stronger azimuth positioning clamps, and (7) sleeve motor bearings. Results indicated that, with the modifications, all buoys worked satisfactorily.

G12/R1218 987
HARRIS, W. T. and VAN LENNEP, D. W.

Double hydrophone-baffle assembly with improved directivity, BARGE measurements of directivity index.
Columbia Univ. - Div. of War Research
Nov. 6, 1944 21p.

This report discusses an interest in increasing listening range and the importance of also increasing discrimination against ambient water noise and ship's noise (i.e., to increase the directivity index of the

hydrophone-baffle system). An ambient noise-limited system range can be considered as determined solely by the directivity index. Photos, diagrams, and curves are included.

D16/R1219 988
SUTER, H.

Type tests of AN/ARR-3 receiving equipments.
Columbia Univ. - Div. of War Research
Nov. 1, 1944 10p.

This report discusses type tests made on seven AN/ARR-3 receiving equipments. The mechanical inspection consisted of an examination of the receivers for loose, missing, or defective parts. The electrical tests are outlined in detail in the attached "R-2/ARR-3 Receiver Type Test" form. With the exception of one receiver, which developed a short circuit after leaving the factory, all receivers performed satisfactorily. Also attached are tables involving the topics of (1) frequency change from cold start, (2) audio response, (3) discriminator and selectivity patterns, (4) sensitivity and image-rejection ratio, (5) frequency limits, (6) frequency and sensitivity changes with battery supply voltages, and (7) AFC action at 70.1-Mc 40- V input.

P55/R1220 989
KNUDSON, W. T. and PRATT, R. W.

Comparative noise-level monitor and Navy sound-range noise tests on USS BOARFISH (SS-327).
Columbia Univ. - Div. of War Research
Nov. 2, 1944 7p.

This report describes the calibration of the NLM on USS BOARFISH to establish a reference sound level to allow ship's

personnel, at any time, to measure the underway noise of the snip and the noise of the auxiliary machinery. Table I (attached) is titled "Noise Level Monitor Underway Measurements" and table II (attached) is titled "Noise Level Monitor Readings for Sound Range Conditions."

D55/R1221 990
Specification for Model NL-144 test set.
Columbia Univ. - Div. of War Research
Nov. 9, 1944 v.p.

This specification covers the mechanical, electrical, and performance requirements of the Model NL-144 test set, for use with JT sonar equipment, which consists of an attenuation and phase-shift system and an electronic "noise" source. Included are curves, photos, parts lists, and drawings.

D50/R1222 991
HOFF, H. B.; PERRY, G. R.; BUSH, W. M.; and COLE, D. L.
Depth-charge range meter tests.
Columbia Univ. - Div. of War Research
Nov. 20, 1944 v.p.

A series of tests was conducted to evaluate and accurately calibrate the depth charge range meter. It was decided that accurate indications should be expected under most thermal conditions within the range of 500 yd, and that between 500 and 1,000 yd accurate results should be expected about 75 percent of the time. Included are tables, a navigation map, a diagram of detonating and surge-transmitting equipment on SC-665, and numerous curves.

D34/1223 992
MACLAUGHLIN, R. R. and VAN LENNEP, D. W.

Insulation requirements for the DRSB hydrophone.
Columbia Univ. - Div. of War Research
Nov. 8, 1944 5p.

This report discusses an investigation to determine the extent to which insulation damage might impair the operation. For this purpose, acoustic calibrations and directional patterns were made on BARGE on a DRSB hydrophone run through an input transformer of the type developed for this use. It was concluded that this hydrophone must be protected from unusual mechanical abuse but that a minor insulation defect or break would not be of consequence. A frequency curve is included.

D16/1224 993
MACLAUGHLIN, R. R. and VAN LENNEP, D. W.

Insulation requirements of the M-7/CRT-1A hydrophone.
Columbia Univ. - Div. of War Research
Nov. 8, 1944 3p.

The results of sampling tests made after test drops on numerous series of M-7/CRT-1A units manufactured under the 20,000-ohm insulation requirement have consistently shown the insulation to be well in excess of that required for satisfactory performance, and the units to be free from any of the defects of workmanship outlined in this memorandum. It, therefore, appears that the present insulation requirements are practicable from a manufacturing standpoint and result in consistently satisfactory performance of the units.

D34/R1225 994
MACLAUGHLIN, R. R. and VAN LENNEP,
D. W.

Performance characteristics of
the DRSB hydrophone and baffle.
Columbia Univ. - Div. of War
Research
Nov. 8, 1944 2p.

The frequency-response
characteristics and single-
directional patterns of the DRSB
hydrophone and baffle are covered
in Memorandum for File
D34/R1097-874. Subsequently, the
directivity pattern of hydrophone
and baffle has been obtained for
the 5- to 9-kc noise band. The
attached figure shows this pattern.

P40/R1227 995
GILLET, G. D.; HULTGREN, H. I.;
and RODELIUS, N. W.

Modification of the Mark I
conning-officer attack teacher.
Columbia Univ. - Div. of War
Research
Feb. 19, 1945 10p.

The Mark I conning officer
attack teacher was built in 1920
and, except for slight alterations,
had not been modernized to meet the
needs of the present greatly
expanded training program. The
modification work is to include the
complete rebuilding of the target
bearing car, so that multiple
targets will be available; the
provision of new and variable
lighting effects; and, later, the
addition of simulated underwater
sounds and radar patterns. The
entire unit is to be controlled
from a modified Mark I torpedo data
computer. Work was begun jointly
by the Navy and the New London
Laboratory in November, 1943, and
modifications were completed by
September, 1944. It is now in
constant use in prospective
commanding-officer training and for
refresher training of submarine
officers who have returned from
battle areas. Photos and diagrams
are included.

P55/R1228 996
Specification for Model
NL-131-A watertight junction box.
Columbia Univ. - Div. of War
Research
Nov. 13, 1944 8p.

This specification covers the
manufacturing requirements for a
Model NL-131-A watertight junction
box. This unit provides a
watertight chamber into which seven
1/2-in. and one 7/8-in. diameter
rubber-covered cables can be run
for splicing. Included are photos,
a parts list, and drawings.

D55/R1229 997
Preliminary operating
instructions for the JT sonar
equipment.
Columbia Univ. - Div. of War
Research
Nov. 15, 1944 v.p.

The JT sonar equipment
described in this instruction book
is designed to furnish to the
conning officer of a submarine
highly accurate data for the
preparation of an attack on a
target. The instructions are for
the two JT sonar equipments
carrying an RQ designation on the
nameplate. These equipments are
production samples, and will vary
to some extent from the later
models, which will bear a CRV
designation on the nameplates.
When operating or servicing models
having a CRV designation, reference
must be made to the instruction
book for that model. Included are
photos, diagrams, parts lists, and
drawings.

D55/R1229-A 998
Issue 2 of preliminary
operating instructions for the JT
sonar equipment.
Columbia Univ. - Div. of War
Research
Nov. 15, 1944 51p.

This manual is identical to D55/R1229997 and is merely a reissue. Reference can, therefore, be made to the previous manual for description.

G12/R1230 999

MACLAUGHLIN, R. R.

Test equipment and methods for relative-permeability measurements on nickel tubing.
Columbia Univ. - Div. of War Research
Nov. 10, 1944 7p.

The functioning of a magnetostrictive transducer is dependent on the state of anneal and resultant magnetic properties of the nickel. Experience with the large-scale production of the D16-Mark IVE and M-7/CRT-1A hydrophones employed in the ERSB indicates that relative-permeability measurements, as between lots of tubing or portions of the same lot, constitute a valuable and effective means for controlling the uniformity of the resulting product. Included are photos and a diagram of a tube-permeability tester.

D28/R1231 1000

MARKHAM, J. J. and PERRY, G. R.

A compilation of all complete oceanographic stations of the New London Laboratory from May 1943 to November 1944.
Columbia Univ. - Div. of War Research
Dec. 3, 1944 2p.

This collection of oceanographic data is made for the purpose of preserving, in a single source of reference, all oceanographic stations occupied by representatives of the New London Laboratory in the 18 months

from May, 1943, until November 1944. Included are bathythermograph slide charts and navigational charts.

D21/R1232 1001

RHEA, D. O.

Pull-match ignition for Mark VI float light.
Columbia Univ. - Div. of War Research.
Nov. 20, 1944 6p.

This completion report describes the adaptation of a pull-igniter to the Mark VI float light. This new method of igniting the float light enables it to function independently of (1) the method of launching, (2) the stability of air flight, and (3) the angle of entry into the water. The pull-igniter can be actuated by a light static line if the float light is launched from an aircraft, or by hand if it is launched from a surface vessel.

P37/R1233 1002

HANSON, R. C. and WATKINS, W. B.

Recordograph film recorder.
Columbia Univ. - Div. of War Research
Nov. 11, 1943 4p.

A Recordograph film recorder has been obtained by the Sound Recording Group and is available for use by the Laboratory. This memorandum describes the recorder and gives instructions for its use. A graph is included.

D34/R1234

1003

MASON, R. I.

Further drop tests of directional radio sono buoys. Columbia Univ. - Div. of War Research
Nov. 13, 1944 2p.

This report covers drops of five production-model directional radio sono buoys. All five of the launches were perfect. Three of the drops appeared to be satisfactory in every respect. The tests demonstrate that the new dye bags and the new line-guard brackets are satisfactory.

P21/R1235

1004

KROENERT, J. T.

Amplifier unit for Model QFL tactical range recorder teacher. Columbia Univ. - Div. of War Research
Nov. 13, 1944 2p.

In January, 1944, the Electronic Design Group completed the electrical and mechanical design of the amplifier unit used in the Model QFL tactical range-recorder teacher. The amplifier is designed for use with the following associated equipment: (1) five visual indicating chemical recorders, and (2) loudspeaker with phonograph reproducing unit. A bibliography is included.

P61/R1236

1005

ZERN, R. T.

Propeller-noise discrimination meter. Columbia Univ.-Div. of War Research
Nov. 13, 1944 5p.

The Electronics Group has completed the propeller-noise discrimination meter. This unit will be used to test personnel to

be trained as submarine-sonar operators. The test measures the minimum detectable level of noise sounding like propeller beats in the presence of a steady background noise. This memorandum provides a detailed explanation of the equipment. Drawings are included.

D55/R1237

1006

KROENERT, J. T.

NL-144 test set for JT sonar equipment. Columbia Univ. - Div. of War Research
Nov. 13, 1944 3p.

The Electronics Design Group has completed the electrical and mechanical design of the NL-144 test set for use with JT sonar equipment. A photograph and brief description of the set are included.

D24/R1238

1007

HERRNFELD, F. P. and KROENERT, J. T.

NL-117-A amplifier for sonic listening. Columbia Univ. - Div. of War Research
Nov. 14, 1944 v.p.

The Electronic Design Group developed the NL-117-A amplifier. This amplifier is similar to the NL-117, but it has several additional features. A model has been subjected to several days of sea tests and has performed satisfactorily. Graphs, photographs, and a drawing are included.

D34/R1239

1008

CLEARWATERS, W. L.

Overall tests of sample Emerson DRSB's. Columbia Univ. - Div. of War Research
Nov. 14, 1944 2p.

This memorandum covers tests held on October 11, 1944, for the purpose of checking. During the tests, four buoys were launched from the tunnel hatch of a PBY flying at 130 knots at 500 ft. The test results are discussed in this memorandum. The present dye pack does not open properly and a scratchy noise, which prevents good listening, is present in some of these buoys.

D25/R1240 1009
FRITZ, W. H.
Blimp-towed hydrophone.
Columbia Univ. - Div. of War
Research
Dec. 1, 1944 13p.

Contact by a blimp with a surfaced submarine may be made either visually or with radar. Since the submarine can submerge before the blimp is able to reach a spot directly above it, the suggestion was made that a hydrophone, which could be lowered from and towed by a blimp, might be employed to maintain contact with the submarine until assistance arrives. This report describes the various hydrophones considered for this application, with particular attention to a 4-ft unit constructed in three sections to provide satisfactory directional characteristics. A review of the tests that led to improvements suggested for a final design is included. A careful review of the project and a study of the usefulness of this gear, as compared with that of other means of detecting submarines, led to the abandonment of the project in February 1943. Photographs and a graph are included.

D34/R1241 1010
MACLAUGHLIN, R. R. and VAN LENNEP,
D. W.

Evaluation of annealing VI.
Columbia Univ. - Div. of War
Research
Nov. 17, 1944 3p.

This memorandum covers the results of tests made on samples of nickel tubing, 1-3/4 in. in diameter with a wall thickness of 0.025 in., produced and annealed by the International Nickel Company for use in the construction of the hydrophone associated with the directional radio sono buoy. It was concluded that the 3-hr 1100°F anneal performed by the International Nickel Company is a suitable treatment for the heats involved.

D51/R1242 1011
STEPHENSON, R. G.

Frequency quadrupling as a means of reducing interference from other targets.
Columbia Univ. - Div. of War
Research
Nov. 16, 1944 5p.

A proposal to quadruple the frequency of the signal from each half of a split hydrophone, before combining them in a sum-and-difference transformer for RLI system amplifiers, has been investigated. It has been found that, on single frequencies the difference pattern on-target null has been sharpened by a factor of four compared to the standard difference pattern; on 5- to 9- kc noise, the improvement seems to be much less. This sharpening of on-target hull permits a reduction in system gain and, hence, a lesser signal from interfering targets for a given number of volts per degree of train from the RLI system.

For the TLR system, the improvement obtained does not justify the great increase in circuit-design difficulty. A graph and a drawing are included.

D24/R1243 1012
VAN LENNEP, D. W. and HARRIS, W. T.
Tests on two COG 51053 (JP-1) hydrophones in NL-109 baffles, removed from USS SARGO and USS GABILAN.
Columbia Univ. - Div. of War Research
Nov. 17, 1944 6p.

Tests have been completed on two COG 51053 (JP-1) hydrophones in NL-109 baffles, removed from USS SARGO and USS GABILAN. These units were returned to the Laboratory for tests because of apparent erratic performance and change of sensitivity and directional characteristics at different depths. The test results did not indicate a cause of the unsatisfactory performance. Although the GABILAN baffle was below average, it is very improbable that this fact could be established by listening tests. The difficulties encountered may have been due to faulty operation or maintenance of some component of the equipments other than the hydrophones. Graphs are included.

P34/R1244 1013
VAN LENNEP, D. W. and MANINGER, R. C.
Acoustical calibrations and measurements at the New London Laboratory.
Columbia Univ. - Div. of War Research
Apr. 30, 1945 v.p.

Early in the history of the New London Laboratory, it was recognized that, to develop underwater sound apparatus for submarine warfare, it would be

necessary to have a means of quickly calibrating such equipment. The calibrating BARGE has satisfied this need. It has continually been improved and, at present, has two calibrating wells, electrical equipment patterned after that in use at the Underwater Sound Reference Laboratory, and much special apparatus particularly applicable to the work at New London. This equipment together with its uses, is described in part I of this summary report. The equipment and methods used in measurements at sea of sounds from submarines and surface craft, as well as of ambient noises in various locations due to sea life and other sources, is discussed in part II. Photos, drawings, graphs, and a bibliography are included.

D50/R1245 1014
SNOW, W. B.
Conference with Dr. Lyman Spitzer.
Columbia Univ. - Div. of War Research
Nov. 16, 1944 20p.

A conference was held with Dr. Lyman Spitzer, of Section 6.1 NDRC regarding revisions to preliminary bulletin D50/R987, 'Effect of Temperature Gradients on the Above-Below Indications of the Depth Charge Direction Indicator'. The changes in instructions were necessitated by the fact that, with the depth charge direction indicator as presently installed, the submariners have poor information, if any, regarding the ranges at which the depth charges explode. It was decided to reduce the instructions for using the above-below indicator to a simple table employing bathythermograph information which is available in the submarine and will give the submarine commander an appropriate idea of the capabilities and limitations of the above-below indicator.

D51/R1246
SAWYER, C. R.

1015

Conference with Sperry
Gyroscope Company engineers,
November 9, 1944.
Columbia Univ. - Div. of War
Research
Nov. 18, 1944 4p.

This memorandum reports on a conference held with engineers of the Sperry Gyroscope Company. The conference was held to discuss the technical aspects of a proposal by the Navy that the triangulation-listening-ranging system removed from USS S-48 be revamped and made seaworthy for use in war patrol. The general reaction of Sperry engineers was that the calculator was designed for experimental, rather than service, conditions and that some parts would probably have to be changed after each war patrol.

D53/R1247
TEAL, E. E.; PROUDFOOT, D. A.;
KNUDSON, W. T.; and STRADLING, L. J.

1016

Noise and vibration
measurements on submarine reduction
gears at the Farrel-Birmingham
Company.
Columbia Univ. - Div. of War
Research
N.D. v.p.

Engineers from the Laboratory visited the Farrel-Birmingham Company to observe sound-measurement tests of reduction gears. This memorandum reports on their observations. Graphs are included.

G12/R1248
HARRIS, W. T.

1017

A permanent-magnet
magnetostriction hydrophone
construction.
Columbia Univ. - Div. of War
Research
Dec. 20, 1944 v.p.

This report describes a basic design for broadband magnetostrictive transducers employing cylindrical toroidally wound permanent-magnet polarized motor elements and cast-plastic assembly constructions. The NL-124 and NL-130 hydrophones are examples of such transducers in production for the Bureau of Ships (under the designations CQA-51074 and CQA-51079). Graphs, photos, and drawings are included.

D53/R1249
SNOW, W. B. and HERRNFELD, F. P.

1018

Model OAY sound-measuring
equipment.
Columbia Univ. - Div. of War
Research
May 3, 1945 v.p.

In 1942, Columbia University, Division of War Research, at the New London Laboratory, was requested by the Bureau of Ships to develop a new sound-measuring equipment that would be complete and convenient, that would indicate sound levels directly (referring to the standard reference level), and that would be adapted to the needs of the submarine noise-reduction program. Such a device was developed and designated by the Navy as the Model OAY sound-measuring equipment. CUDWR furnished engineering services to the U. S. Navy Underwater Sound Laboratory during construction and shipment of 36 equipments. This completion report describes the technical features of the equipment and suggests lines of further development. Drawings, graphs, photos, and a bibliography are included.

D52/R1250 1019
ROCKWELL, G. O.
Subcaliber practice projectile
and subcaliber spigot unit for the
Mark X projector.
Columbia Univ. - Div. of War
Research
Dec. 11, 1944 v.p.

Naval personnel are trained in
the use of the Mark X projector
(HEDGEHOG) by firing full-size
plaster-loaded projectiles at a
submarine as target. This practice
may damage submarine equipment
carried topside. This report
describes the development of a
practice equipment including a
subcaliber spigot unit, consisting
of a spigot and shroud that are
mounted on the Mark X projector
spigot, and a subcaliber practice
projectile, which were developed by
the New London Laboratory to be
used in training procedures to
eliminate the abovementioned
hazard. This completion report
includes photos and a drawing.

G12/R1251 1020
THURAS, A. L.
Improvement in submarine sonic
listening and bearing accuracy.
Columbia Univ. - Div. of War
Research
Nov. 21, 1944 11p.

This memorandum summarizes
ideas about sonic listening,
bearing accuracy by sonic
listening, and sound bearing
indications. Recommendations are
made regarding simple basic
modifications of the JP-1
equipment. The recommendations
include the following: (1)
substitute an improved 5-ft
hydrophone for the standard 3-ft
JP-1 hydrophone; (2) the hydrophone
should not be delobed and should be
free from longitudinal resonance;

(3) a reversing switch should be
inserted in the input of the
hydrophone to the JP-1 amplifier;
and (4) a shock mount should be
inserted between the hydrophone and
the training shaft. Graphs are
included.

D50/R1252 1021
HAEFNER, S. J.
Depth Charge Range Meter, Model
IV.
Columbia Univ. - Div. of War
Research
Nov. 24, 1944 3p.

A Depth Charge Range Meter,
Model IV, has been completed by the
Electronics Design Group. The
instrument is intended to be
sensitive to the pulse generated by
a blastphone. This memorandum
describes the meter. A drawing is
included.

P33/R1253 1022
WOODWARD, L. A.
Maximum listening ranges of
underwater-sound equipment.
Columbia Univ. - Div. of War
Research
Nov. 23, 1944 8p.

This report carries forward the
compilation of available data on
listening ranges that was first
presented in the Memorandum For
File dated March 13, 1944, entitled
'Maximum Listening Ranges of
Underwater Sound Equipment',
(P33/R794) and augmented by
Addendum I dated July 1, 1944
(P33/R1008). The new data is
exclusively from Pacific war-patrol
reports. A list of sources is
attached to the report.

G12/R1254 1023
MARKHAM, J. J.

Directivity patterns of a delobed hydrophone for various octave bands.

Columbia Univ. - Div. of War Research
Nov. 27, 1944 4p.

A calculation has been made of the average octave-band directivity pattern for the lobe-reduction hydrophone developed for RLI systems by the Transducer Development Group. To obtain the pattern, one must integrate the energy at a given angle over the band of frequencies. Graphs are included.

P35/R1255 1024
MODE, D. E.

Triode phase detectors.
Columbia Univ. - Div. of War Research
Nov. 24, 1944 8p.

This report describes three amplitude- and phase-sensitive detector systems in which the voltages being compared are noninterfering, that is, negligible coupling exists between the circuits carrying one voltage and those associated with the other. The sensitivity of these detectors is about the same as the diode-detector scheme employed in the first production models of the RLI system.

D55/R1256 1025
Specification for Model NL-145 bearing-calibrator noise source.
Columbia Univ. - Div. of War Research
Nov. 25, 1944 12p.

This specification covers the mechanical, electrical, and performance requirements of the Model NL-145 bearing-calibrator noise source. This device consists

of an electronic noise generator enclosed in a metal case equipped with a metal front panel.

P37/R1257 1026
HANSON, R. O. and WATKINS, W. B.

Operating and servicing instructions, Presto Model 6N disc recorder.
Columbia Univ. - Div. of War Research
Nov. 25, 1944 v.p.

This report describes the operation and servicing of the Presto Model 6N disc recorder.

D53/R1258 1027
WAGNER, R. A. and PRATT, R. W.

Overside noise measurements on the USS HACKLEBACK SS-295.
Columbia Univ. - Div. of War Research
Nov. 24, 1944 3p.

Overside auxilliary-machinery measurements were made on USS HACKLEBACK. Members of the Laboratory introduced the overside-measurement technique to members of the base sound force, who expect to make measurements of this sort as a routine part of their future program. A chart is included.

D56/R1259 1028
THURAS, A. L.

Underwater-sonic communication.
Columbia Univ. - Div. of War Research
Nov. 24, 1944 2p.

Further tests have been made on voice-frequency transmission of speech through water. The results were encouraging in that there was considerable voice energy at 12,000 yd. Measurements on a new loudspeaker recently constructed indicate a much higher efficiency.

D34/R1260

1029

Operator's manual for the directional radio sono buoy. Columbia Univ. - Div. of War Research
Dec. 15, 1944 30p.

The directional radio sono buoy is a development of the expendable radio sono buoy, which has been highly successful in detecting enemy submarines. The directional buoy not only tells the operator if a submarine is present, but also indicates the direction of that submarine from the buoy. This operator's manual contains numerous illustrations.

P35/R1261

1030

CHIPMAN, L. E.

Battery-operated RMS vacuum-tube voltmeter. Columbia Univ. - Div. of War Research
Nov. 28, 1944 5p.

The vacuum-tube voltmeter described in this report has the following characteristics: (1) true root-mean-square voltage regardless of wave shape of voltage being measured; (2) no turn-over effects; (3) high input impedance; (4) flat frequency response from 20 cycles to 20 kc; (5) battery operated to reduce or eliminate hum pickup in high-gain circuits used in conjunction with it. Drawings and a graph are included.

P36/R1262

1031

HORTON, J. W.

Echo-Doppler indicator. Columbia Univ. - Div. of War Research
Dec. 15, 1944 8p.

Early in 1943, discussions with Navy personnel concerned with sound-operator training disclosed the fact that considerable difficulty has been experienced at U. S. Navy sound schools in training

operators to distinguish increments of pitch with sufficient accuracy to permit full utilization of the Doppler effect in echo ranging as a measure of the movement of the submerged target. The Laboratory undertook the development of an echo-Doppler indicator, which would provide a visual means of indicating the frequency shifts in reverberation and echo signals. The Navy has ordered 18 of these indicators. Photos and drawings are included with this completion report.

D56/R1263

1032

MARKHAM, J. J.

Correlation of oceanographic and acoustic data taken during underwater-telephony tests. Columbia Univ. - Div. of War Research
Dec. 1, 1944 6p.

A series of underwater-telephony tests were made in Block Island and Long Island Sounds. As a byproduct, some transmission data were obtained. An attempt is made to show that the transmission loss can be correlated with the oceanographic data taken during these tests. In particular, an attempt is made to show that, if oceanographic differences are taken into account, the transmission-loss found compares favorably with earlier transmission losses found by this Laboratory. A table and a graph are included.

D53/R1264

1033

WAGNER, R. A.; KNUDSON, W. T.; and PRATT, R. W.

USS S-48 noise and vibration measurements. Columbia Univ. - Div. of War Research
Nov. 30, 1944 v.p.

A series of measurements of both vibration and underwater noise caused by various auxiliaries of

USS S-48 (SS-159) was conducted. The main purpose of these measurements was to investigate the validity of auxilliary-machinery noise measurements made with the ship at dock in the Thames River and to determine whether such measurements are directly comparable to similar measurements made on the U.S. Navy Sound Range in Gardiners Bay. A secondary purpose was to establish any correlation possible between the underwater noise of an auxilliary and the vibration of that auxilliary, or its support, as directly measured. The results of the various tests show that reasonably close duplication was obtained on all noise readings except those taken through the hydrophone 200-ft abeam with submarine at the dock at Fort Trumbull. This location generally gave values lower than obtained elsewhere. Drawings, graphs, and charts are included.

P35/R1265 1034
 MODE, D. E. and HERRNFELD, F. P.
 RLI clipper-amplifier system.
 Columbia Univ. - Div. of War
 Research
 Dec. 14, 1944 5p.

This report describes an RLI system in which variation in input level is taken care of by a clipping amplifier rather than by the usual combination of AVC and manual gain control. It is indicated that no small-tolerance parts need be used anywhere in the circuit. Controls consist of an off-on switch and a knob for adjusting the RLI meter zero. Graphs and drawings are included.

P35/A31/R1266 1035
 HAEFNER, S. J.
 Portable noise generator.
 Columbia Univ. - Div. of War
 Research
 Nov. 30, 1944 2p.

This memorandum describes a noise generator that has been completed by the Electronics Design Group. A drawing is included.

P63/R1267 1036
 Submarine radar operator's
 course.
 Columbia Univ. - Div. of War
 Research
 Dec. 2, 1944 v.p.

This report was prepared by Project NS-146, Applied Psychology Panel, Submarine Radar Operator's School, and Columbia University, Division of War Research. It outlines a 2-week course for submarine radar operators.

D56/R1268 1037
 MODE, D. E.
 80-W single-sideband
 suppressed-carrier transmitter.
 Columbia Univ. - Div. of War
 Research
 Dec. 5, 1944 v.p.

This memorandum describes a single-sideband transmitter for underwater telephony recently completed by the Electronic Design Group. The transmitter and separate power-supply unit are mounted in a sheet-metal cabinet and arranged on slides so that they can be rolled out and rotated 90 deg. A terminal strip inside the cabinet is provided for making connection to the unit through four stuffing tubes. Drawings are included.

A30/R1269 1038
 PETIT, F. W.
 Speed-halving unit.
 Columbia Univ. - Div. of War
 Research
 Jan. 17, 1945 10p.

A speed-halving unit has been designed for use with the Mark III torpedo data computer on

submarines. This device provides a means for doubling the effective tracking range of the TUC by automatically halving the own-ship's-speed factor fed into the TDC. It is an interim device to be used until the TDC's can be altered to include the unit's function. A bibliography, photos, and drawings are included with this completion report.

P26/R1270 1039
GILLETTE, G. D. and SHAFFER, W. G.
Synchro-system test unit.
Columbia Univ. - Div. of War
Research
Jan. 17, 1945 6p.

This report discusses the synchro system test unit. The unit was to be used to obtain information desired primarily in the evaluation of certain acceptance tests that had been used in inspecting synchros; and, secondarily, for studying the performance of synchro systems onboard ships. A model was built and tested. The project was abandoned because of the pressure of other work and because of a lack of interest in the device by the Bureau of Ordnance. A photo and drawings are included.

D53/R1271 1040
VAN LENNEP, D. W.
Calibration of RQ-51055
(AX-58A) hydrophones to be employed
with OAY sound meters, comparison
of two methods.
Columbia Univ. - Div. of War
Research
Dec. 7, 1944 8p.

The present method employed in calibrating RQ-51055 (AX-58A) hydrophones for OAY sound meters is described. As the hydrophone preamplifier might be expected to have different gain and frequency characteristics under different

calibrating and operating conditions, an effort has been made to identify this difference and determine how much it would affect the accuracy of the computed correction factor. As a result of this study, it is recommended that the present calibration technique be retained, as this method gives the nearer approach to true crystal voltage calibrations without measuring preamplifier gain over the whole band. Graphs and a table are included.

P37/R1272 1041
HANSON, R. O.
Record processing at the New
London Laboratory.
Columbia Univ. - Div. of War
Research
Dec. 8, 1944 6p.

Concurrent with the beginning of recording at the Laboratory came the problem of obtaining satisfactory pressings for distribution. This report discusses some of the problems that have arisen. It also outlines typical methods of operation at the Muzak plant in New York City, where the pressings are made. A photo is included.

P37/R1273 1042
HANSON, R. O.
New London Laboratory record
file and catalog.
Columbia Univ. - Div. of War
Research
Dec. 7, 1944 8p.

The problem of filing sound recordings for ready reference, cross-indexing from several pertinent angles, and preparing these data in catalog form has been, at the New London Laboratory, a difficult matter. Consequently, a Record Library has been established. This report describes the organization of the Record Library.

D34/R1275 1043
ARCHER, G. W.
DRSB compass capacitor checker.
Columbia Univ. - Div. of War
Research
Jan. 6, 1945 5p.

The Electronics Design Group has completed a compass capacitor checker. The unit was designed to be used primarily for the comparison of a capacitor under test with a standard capacitor. The standard capacitor was chosen to give the desired deviation of the oscillator circuits of the DRSB. This report contains operating and alignment procedures for the checker. A drawing and photos are included.

P34/R1276 1044
HARRIS, W. T.
An air-jet high-frequency noise source.
Columbia Univ. - Div. of War
Research
Dec. 7, 1944 5p.

An air-jet powered noise source has been constructed for possible use in aligning JT sonar gear in air at docks or in shipyards. This memorandum discusses the construction and performance of the noise source. A graph, a photo, and a drawing are included.

P33/R1277 1045
ELLISON, J. V.
A method for reproducing supersonic-underwater signals.
Columbia Univ. - Div. of War
Research
Dec. 12, 1944 3p.

This report presents a relatively simple method for reproducing bands of supersonic signals. Probably the greatest limitation of this method of

reproducing supersonic signals lies in the single-sideband filter used in the transmitter. For any given filter, only those signals falling within its passband may be accommodated. Thus, different frequency bands will require different filters.

P37/R1278 1046
HANSON, R. O. and WATKINS, W. B.
Equalizer design.
Columbia Univ. - Div. of War
Research
Jan. 8, 1945 v.p.

This report describes examples of equalizer-design. It includes equalizer-design charts, as shown in MOTION PICTURE SOUND ENGINEERING, D. Van Nostrand Company, NJ, 1938, an equalizer-design table, as compiled by the New London Laboratory Recording Department, and three solutions to typical equalizer-design problems.

D51/R1279 1047
KROENERT, J. T.
Test sets for TLR.
Columbia Univ. - Div. of War
Research
Dec. 12, 1944 6p.

The Electronic Design Group has completed three test sets for the TLR group. These units are identical electrically and differ only slightly in minor mechanical details. The units consist of a vacuum-tube voltmeter, resistance-tuned oscillator, noise source, power supply, and an attenuation and phase shift network. Photos and a drawing are included.

D16/R1280 1048
FISH, P. E.
TBM ERSB receiver-recorder
installation.
Columbia Univ. - Div. of War
Research
Dec. 13, 1944 9p.

As a result of BuAer
recommendations that a separate
line be provided all listeners of
the ERSB (with ICS conversations
superimposed, but without other
radio-receiver signals),
COMAIRLANT, at Norfolk, is
currently associating the ERSB
receiver and recorder with the TBM
airplanes' radio and interphone
system, as shown in the attached
functional block diagram. It is
believed that improved listening
and recording will result from this
clean channel.

P55/R1281 1049
SNOW, W. B.
Noise-level monitor and
cavitation indicator.
Columbia Univ. - Div. of War
Research
Jan. 31, 1945 12p.

The original work of the New
London Laboratory in the field of
submarine noise reduction involved
noise measurements made on Navy
sound ranges, or overside
measurements made while the
submarine was tied up at a dock or
while drifting. It appeared
desirable that these measurements
should be supplemented by underway
measurements on patrol. The noise-
level monitor described in this
completion report measures underway
noise.

D53/R1282 1050
WAGNER, R. A.
Summary of submarine auxilliary-
machinery vibration correlation
with waterborne noise.
Columbia Univ. - Div. of War
Research
Dec. 13, 1944 5p.

Late in 1943, as a part of the
submarine noise-reduction program,
the Laboratory undertook a series
of studies in an attempt to
correlate the vibration of
submarine auxiliary units with the
noise they produced in the water.
From a consideration of the work
that has been accomplished, it is
felt that no worthwhile result will
be accomplished by further work
seeking to establish a general
direct correlation between
vibration and water noise. A graph
is included.

G12/R1284 1051
VAN LENNEP, D. W. and HARRIS, W. T.
Tests on NL-124 hydrophones
manufactured by Astatic Corporation.
Columbia Univ. - Div. of War
Research
Dec. 15, 1944 v.p.

Initial-production hydrophones
manufactured by the Astatic
Corporation for RCA for use on JT
sonar systems have been submitted
to the Laboratory for tests and
approval. They were found to be
satisfactory. Graphs are included.

D50/R1285 1052
ROCKWELL, G. O.; HOFF, H. B.; and
ORDING, J. R.
Supplement to 'Depth Charge
Range Meter Tests' (D50/R1222).
Columbia Univ. - Div. of War
Research
Dec. 16, 1944 5p.

This memorandum, which
supplements Depth Charge Range
Meter Tests, Memorandum for File
D50/R1222 (accession number 991),
November 20, 1944, describes
additional range-meter tests. A
photo and a drawing are included.

D34/R1286 1053
Specification for Model NL-136
rotating test unit.
Columbia Univ. - Div. of War
Research
Dec. 22, 1944 v.p.

This specification and the associated drawings cover the manufacturing requirements for the Model NL-136 rotating test unit. This unit is to be used for testing component parts of the directional radio sono buoy. It consists of individual receptacles for the complete buoy assembly, the transmitter assembly, and the compass assembly, any of which can be rotated in either direction at speeds adjustable from 8 to 2 rpm.

D57/R1287 1054
HORTON, J. W.
Use of cathode-ray tube in proposed WCA-2 echo-ranging modifications.
Columbia Univ. - Div. of War
Research
Dec. 18, 1944 4p.

This memorandum summarizes the situation with respect to the use of a cathode-ray tube in connection with WCA-2 echo-ranging equipment, the steps which have been taken toward providing for this use, and proposals relating to the further prosecution of project D57.

P37/R1288 1055
HANSON, R. O.
The wide-range 22-second recorder-reproducer set.
Columbia Univ. - Div. of War
Research
Jan. 5, 1945 v.p.

This report describes the equipment mentioned in the title.

D54/R1290 1056
LOYE, D. P.; PROUDFOOT, D. A.; and
TEAL, E. E.
Submarine 1- and 7-MC internal communication systems.
Columbia Univ. - Div. of War
Research
Jan. 17, 1945 9p.

In January 1944, the New London Laboratory was requested by the Bureau of Ships to undertake studies of the internal-communication systems of Fleet-type submarines. Articulation tests and observations of the 1- and 7-MC systems were made on several submarines. This work led to the accumulation of a large amount of data, the analysis of which formed the basis of a number of recommendations for improved performance of the equipment. A specification report covering the studies, recommendations, and descriptions of the modified 1- and 7-MC systems was submitted to the Bureau of Ships in June 1944.

G8/R1292 1057
Index to documents issued by the New London Laboratory.
Columbia Univ. - Div. of War
Research
N.D. 94p.

This index is arranged by project.

P61/R1293 1058
ZERN, R. T.
Instructions for the propeller-noise discrimination meter.
Columbia Univ. - Div. of War
Research
Jan. 6, 1945 6p.

The propeller noise discrimination meter is a device to be used in studying methods of selecting personnel to be trained as submarine-sonar operators. Its function will be to test the

suitability of such personnel by measuring the minimum detectable level of noise sounding like propeller beats in the presence of a steady background noise. The report describes the meter and provides instructions for its use. A drawing is included.

D55/R1294 1059
SAWYER, O. E.

Visit to RCA, Indianapolis plant, December 4 and 5, 1944. Columbia Univ. - Div. of War Research
Dec. 19, 1944 2p.

The principal object of this visit to Indianapolis was to obtain from RCA sufficient information regarding the pilot models of JT sonar equipment to enable the installations to be planned properly. Certain other points were also discussed.

D55/R1295 1060
SAWYER, O. E.

Visit to Mare Island Navy Yard, December 8 and 9, 1944. Columbia Univ. - Div. of War Research
Dec. 21, 1944 4p.

The object of the trip to Mare Island was to provide to people at the Navy Yard the latest information concerning the JT pilot models and to prepare for the JT installation to be made at Mare Island.

G11/R1296 1061
NEFF, W. D.

Report on submarine-sonar operators' course at West Coast Sound School. Columbia Univ. - Div. of War Research
Dec. 21, 1944 52p.

During November 1944, members of the CUDWR Training Group worked with the staff of the West Coast Sound School and CUDWR representatives to organize a training course for submarine-sonar operators. The program outlined in this report was the result of the joint efforts of the three groups. It includes (1) schedule of lectures, (2) outline of lectures, (3) sound recognition trainer schedule, and (4) submarine-listening trainer schedule.

P35/R1297 1062
HERRNFELD, F. P.

RLI clipper-amplifier system, part II. Columbia Univ. - Div. of War Research
Dec. 22, 1944 2p.

In the first part of this report, an RLI system was outlined in which variation in input level is taken care of by a clipping amplifier. This report continues discussion of the system and describes a way to increase system sensitivity without a major change in design.

P37/P1298 1063
HANSON, R. O.

The triple-head recorder. Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

The purpose of the triple-head recorder was to provide a means of recording the outputs of three devices simultaneously and in synchronism so that the outputs could be reproduced and their relative qualities compared at some later time. Since MIT had already designed a triple-head recording machine, arrangements were made to obtain complete design information on it. Apparatus constructed using

these plans was found to have several difficulties, which prompted redesigning the equipment. The second version of this recording channel was completed in June, 1943. A complete description of both versions of this triple head is given in this report.

P37/R1299 1064
HANSON, R. O. and WATKINS, W. B.
Laboratory field recording.
Columbia Univ. - Div. of War
Research
Mar. 2, 1945 v.p.

In addition to the extensive sound-recording and dubbing services at the Laboratory, there have been established very complete high-quality recording facilities for varied types of field recording. These are described in the present report.

G12/R1301 1065
WOODWARD, L. A.
Theoretical formulae of hydrophone patterns integrated over a band of frequencies.
Columbia Univ. - Div. of War
Research
Jan. 8, 1945 11p.

The purpose of this memorandum is to record some formulae on theoretical hydrophone patterns integrated over a band of frequencies that have been derived for use of the Listening Group. Graphs are included.

P48/R1302 1066
ZERN, R. T.
Control unit for the sound-injector training aid for submarine sonar gear.
Columbia Univ. - Div. of War
Research
Jan. 8, 1945 2p.

The Electronics Group has completed the control unit for the sound injector training aid for submarine sonar gear. The function of this unit is to modify the input signals from the echo generator and the propeller-beat generator, to generate and control water noise, and to mix these signals in such a way that when they are impressed on a model 755 receiver the audible output signal of the receiver simulates the ping, reverberation, propeller beat, water-noise, and echo heard when echo ranging at various distances.

D51/R1303 1067
LODA, C. J.
Preliminary report of TLR installation on the USS CONGER.
Columbia Univ. - Div. of War
Research
Jan. 8, 1945 3p.

Following a 5-month period of field tests of a TLR unit on USS S-48, CUDWR was authorized to modify this installation preparatory to its immediate transfer to a Fleet-type submarine. The submarine chosen was USS CONGER (SS-447). This report discusses how the gear will be mounted. A drawing is included.

P35/R1304 1068
REYNOLDS, A. T.
Low-frequency bridge detector.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 2p.

The Electronics Design Group has completed a selective amplifier for low-frequency bridge measurements. It consists of a wide-range amplifier and a variable degenerative selective network in the form of a parallel T-circuit. A drawing is included.

G13/R1305 1069
HAEFNER, S. J.
Frequency-dividing network and modification of type MI-4288G RCA power amplifiers for driving Bostwick and Crystal projectors. Columbia Univ. - Div. of War Research
Jan. 8, 1945 6p.

A frequency-dividing network was designed to work with two modified RCA Type MI-4288G power amplifiers at a crossover frequency of 5 kc. Drawings are included.

P63/R1306 1070
Outline of submarine-sonar maintenance course. Columbia Univ. - Div. of War Research
Dec. 29, 1944 58p.

This course outline has been prepared by members of the Training Group, Columbia University Division of War Research, in collaboration with officers of the Submarine Sonar Maintenance School.

D53/R1307 1071
TEAL, E. E.
Noise reduction in the submarine gyro setting indicator-regulator system. Columbia Univ. - Div. of War Research
Jan. 31, 1945 v.p.

The present report describes the work of the New London Laboratory in the reduction of noise in the submarine gyro setting indicator-regulator system. Measuring and analyzing techniques have been worked out that can be applied to many other problems. Graphs and drawings are included.

P63/R1308 1072
Training program and instructor's manual for COMSUBLANT sonar-radar training barge (YNG-22). Columbia Univ. - Div. of War Research
Jan. 10, 1945 69p.

The COMSUBLANT Sonar-Radar Training Barge (YNG-22) will provide training for men assigned to new-construction boats at New London and Portsmouth. Barge instruction will be at an intermediate or advanced level. The 1-week course will emphasize drill in sonar procedures and watch standing, operation of new sonar equipment, and drill in radar-scope interpretation and watch standing.

D55/R1309 1073
SAWYER, O. E.
JT sonar installations, discussion with BuShips. Columbia Univ. - Div. of War Research
Jan. 11, 1945 3p.

A meeting with BuShips was held on December 29, 1944, in an attempt to clarify all doubtful points concerning the installation of the JT sonar-equipment pilot models in particular and the production units in general.

D22/D38/R1310 1074
HANSON, R. O. and TEAL, E. E.
The JP overside and through-the-hull directive sonic-listening equipment for small patrol craft. Columbia Univ. - Div. of War Research
Feb. 7, 1945 v.p.

At an NDRC-Navy conference, the urgent need for listening equipment for use by small patrol craft was stressed. It was decided that an overside-mounted gear, requiring little, if any, prior preparation

or alteration to the hull, be developed. The equipment was developed, tested, and delivered by August 1, 1942. The development of a through-the-hull type training gear was initiated at low priority when the final design of the overside-type gear was turned over to BuShips.

D3/R1311 1075
SNOW, W. B.; MASON, R. I.; and
GRAHAM, W. F.

The anchored radio sono buoy.
Columbia Univ. - Div. of War
Research
Feb. 10, 1945 13p.

The anchored radio sono buoy is a device that, when anchored in a harbor as a part of its protection system, picks up underwater sounds and transmits them by radio to shore receiving stations. The principal contributions of the Laboratory were the selection of the hydrophone, a multiplicity of small but important suggestions for improvement during the tests of the early production models, the development of methods of anchoring and managing the cables to eliminate noise and tangling, and assistance in personnel training. Suggestions for future designs and a bibliography are included.

P37/R1312 1076
HANSON, R. O.

Lateral disc recording at the
New London Laboratory.
Columbia Univ. - Div. of War
Research
Jan. 24, 1945 v.p.

This report contains a short description of lateral recording and the related cutting equipment at the New London Laboratory.

P94A/R1313 1077

Brief description of four new submarine-sonar developments.
Columbia Univ. - Div. of War
Research
Dec. 18, 1944 v.p.

The attached pamphlets contain excerpts from CUDWR laboratory reports describing four new sonar developments that will be installed on submarines in the near future: (1) depth-charge direction indicator, (2) torpedo-detection modification of WCA-2, (3) noise-level monitor, and (4) JT (D-5b) sonar system.

D55/R1314 1078

Preliminary installation
instructions for Model JT sonar
equipment.
Columbia Univ. - Div. of War
Research
Jan. 15, 1945 v.p.

The information in this report is specific to several pilot models. In general terms, the text applies also to production models. Numerous photos and drawings are included.

P60/R1315 1079
SCHELL, F. T.

Modification of WCA-(QB)
training equipment to provide
scanning for torpedo detection.
Columbia Univ. - Div. of War
Research
Jan. 3, 1944 4p.

The purpose of this memorandum is to report on the results of the tests of modified QB training equipment made aboard USS CAIMAN on August 4 and 5, 1943. These tests were made to determine the loads on the training motor when the shaft was being rotated at the scanning speed of 12-1/2 rpm and at normal training speeds when submerged. Subsequent tests were

made on August 6 to determine the effectiveness of the modified gear in detecting approaching torpedoes. Results indicated that the training motor and motor-generator would operate well within safe limits under all anticipated conditions of operation after the TB-20 reductor was substituted for the TB-66SP reductor.

P60/R1316

1080

Preliminary handbook of installation, operation, and maintenance instructions for the torpedo-detection modification of the WCA-2 sonar equipment. Columbia Univ. - Div. of War Research
Feb. 15, 1945 53p.

This manual contains information on the use of the torpedo detection modification applied to the QB side of the WCA-2 echo ranging-listening-sounding equipment to aid a surfaced submarine in detecting an approaching torpedo and determining its bearing in time to permit evasive maneuvers. This modification consists principally of providing for continuous rotation of the QB projector, increasing its speed of rotation from 4 to 12-1/2 rpm, and the addition of a modified Sangamo recorder to record the relative bearings of torpedoes thus detected. Photos, diagrams, parts lists, and spare parts lists are included.

P33/R1317

1081

PERRY, G. R.

Background noise in the supersonic range. Columbia Univ. - Div. of War Research
Jan. 17, 1945 6p.

This memorandum contains data on background noise in the

supersonic range under certain conditions. Data were taken, in part, from ambient-noise and harbor surveys conducted by the New London Laboratory. The greater part of the material was extracted from "Survey of Underwater Sound, Report No. 3, Ambient Noise" prepared by the Sonar Analysis Group, New York.

P38/R1318

1082

GONGWER, C. A.

The fluid gyroscope. Columbia Univ. - Div. of War Research
Feb. 5, 1945 13p.

This report presents a description and the theory of operation of the fluid gyroscope developed by the New London Laboratory during August and December, 1943. The work was done under the general project concerned with the development of a ship's roll indicator to serve as a fire director for forward-thrown depth charges. No further development work was done on the fluid gyroscope after construction of the models described in this report. The project was terminated on December 16, 1944.

P33/R1319

1083

MANINGER, R. C.

Experimental investigation of factors involved in sonic listening. Columbia Univ. - Div. of War Research
Feb. 28, 1945 35p.

This report presents the results of fundamental listening studies carried out in connection with the development of underwater-listening equipment at the New London Laboratory. Included are experimental observations and theoretical interpretations of the observed effects that throw much light on the theory of listening techniques and will serve as a

guide to future studies of underwater listening. The studies included investigations of the effects of hydrophone directivity, effects of amplifier-filter characteristics, effects of signal character, and effects of sea state on hydrophone-bearing accuracy and the audibility of ship signals.

P37/R1320 1084
HANSON, R. O.

The BTL high-fidelity tape recorder.
Columbia Univ. - Div. of War Research
Jan. 27, 1945 v.p.

This report describes the Bell Telephone Laboratory's 5-min high fidelity tape recorder, which is used by the Sound Recordings Group at the New London Laboratory. Included are numerous diagrams, photos, and drawings.

P60/R1321 1085
Operator's manual for the torpedo-detection modification.
Columbia Univ. - Div. of War Research
Jan. 18, 1945 5p.

This manual is a first draft, for laboratory use only, for the torpedo detection modification (TDM) applied to the QB part of the WCA-2 sonar equipment to aid a surfaced submarine in detecting an approaching torpedo and determining its bearing. A diagram is included.

D55/R1322 1086
Operator's manual for the JT sonar equipment.
Columbia Univ. - Div. of War Research
Jan. 18, 1945 9p.

This manual is a first draft, for laboratory use only, for the JT

sonar equipment, which is designed to replace the JP sonic-listening gear. Diagrams are included.

P55/R1323 1087
HERRNFELD, F. P.
Noise-level monitor meter circuit.
Columbia Univ. - Div. of War Research
Jan. 22, 1945 4p.

This report discusses the noise-level monitor voltage limiter and the noise-level monitor meter circuit, and possible circuit changes. Results of the tests performed indicated that any changes are unnecessary at this time. Curves are included.

D16/R1324 1088
CARPENTER, T. H.
Emerson NL-2 design for top-end of AN/CRT-1A.
Columbia Univ. - Div. of War Research
Jan. 24, 1945 10p.

The purpose of this memorandum is to describe the Emerson NL-2 design and the drop test of the first models on January 15, 1945, at New London. The Emerson Model NL-2 is 38.5 in. long and weighs 15 lb 14 oz. They were dropped from a base-forward position in the bomb bay of a TBF aircraft at 140 knots from a 300-ft altitude. The parachute openings were uniformly free from irregularities. Moving pictures were taken of the flight and water-surface action of the models. Results indicated that further testing is necessary to determine the probability of antenna entanglement with the floating load-line. The failure of two models is attributed to weak antenna springs and absence of wind. Photos are included.

P41/R1325

1089

Periscope trainer manual.
Columbia Univ. - Div. of War
Research
Feb. 5, 1945 28p.

The periscope trainer is essentially a full-sized reproduction of the lower part of a Mark II periscope, with the addition of a film drum on top to permit the observation of targets on strips of film. Twelve film strips are provided in an indexed box. Each strip shows 13 Japanese ship models, making 156 targets in all. The models represent 49 main types of merchant vessels and 20 principal classes of warships of the Japanese fleet. This manual also contains photos and recognition charts. The device, itself, can be used for self-instruction by individual students or by a small group with an instructor in charge.

G11/R1326

1090

LARSON, R. O.

Report on underway section of submarine sonar operators' course at West Coast Sound School.
Columbia Univ. - Div. of War
Research
Jan. 20, 1945 17p.

This report outlines the plan for underway training in the fourth week of the course for submarine-sonar operators, as outlined with the staff at the West Coast Sound School. It is presently in use. The first 3 weeks are outlined in report G11/R1296-1061.

G12/R1327

1091

HARRIS, W. T. and VAN LENNEP, D. W.

An experimental streamlined baffle for two hydrophones.
Columbia Univ. - Div. of War
Research
Feb. 9, 1945 19p.

This report discusses a streamlined baffle that offers approximately 10 times less drag than a previous model and is suitable for use on service craft. Interferences in the supersonic range present in the earlier model are eliminated in the streamlined model. This model, therefore, has significant advantages over the JT hydrophone-baffle assembly; greater listening ranges and more accurate bearings are predicted. Numerous curves and a photo are attached.

P17/R1328

1092

KITTREDGE, C. P.; GOURLEY, G. M.;
and BREEZE, G. E.

Fuzes for fast-sinking depth charges.
Columbia Univ. - Div. of War
Research
May 24, 1945 v.p.

This report outlines the work done at the New London Laboratory on the development and testing of fuzes for fast-sinking depth charges. These are intended to overcome many of the objectionable features of the conventional depth charge, such as slow sinking rate, uncertain trajectory, and excessive handling weight. As design studies progressed, it became necessary to obtain some definite knowledge of the shape and weight of the fuzes contemplated for use with the proposed projectiles. In October, the Bureau of Ordnance suggested a preliminary design of a proximity fuze employing a balanced permanent-magnet bridge. Further investigation and development were required, however, before this design could be approved, and the New London Laboratory was asked to assist in the work. Using the original Bureau of Ordnance design as a starting point, and working in collaboration with other research

agencies and the Bureau, this Laboratory continued the development of this and other fuzes for anti-submarine ordnance.

P33/R1329 1093
SNOW, W. B.

Sonic detection of submerged submarine running on diesels. Columbia Univ. - Div. of War Research
Jan. 27, 1945 4p.

This memorandum discusses the problem of sonic detection of submerged submarines running on diesels from the standpoint of an A/S vessel using supersonic gear with a sonic-listening attachment. The conclusion is drawn that, under the conditions assumed, longer detection ranges would be expected with supersonic listening (somewhere above 10 kc). A table outlining the average listening detection range is included.

P37/R1330 1094
BOYERS, J. S.

Notes on the operation of wire recorders at the New London Laboratory. Columbia Univ. - Div. of War Research
Feb. 13, 1945 22p.

This memorandum discusses wire recorders with particular reference to the Model 50 units. Modifications are indicated and are shown on the attached drawings. Photos are included.

P37/R1331 1095
HANSON, R. O. and SOARS, W. F.

The RCA type 73-A recorder, mechanical modifications and operating instructions. Columbia Univ. - Div. of War Research
Apr. 7, 1945 18p.

This report describes the RCA Type 73-A lateral disc recorder. Included are specifications, photos, and drawings. Mechanical modifications and operating instructions are outlined.

P37/R1332 1096
HANSON, R. O.

Rerecording facilities at the New London Laboratory. Columbia Univ. - Div. of War Research
Feb. 28, 1945 40p.

This report discusses the rerecording facilities at the New London Laboratory. The purpose of the facilities is to (1) provide means of copying master records without appreciable deterioration of the frequency characteristic or signal-to-noise ratio; (2) provide the means of making composite records containing spoken announcements, which can be used as demonstration or training records; and (3) provide high-fidelity playback and monitoring facilities, which may be used for listening tests to evaluate records made in the field. Numerous curves, photos, and drawings are included.

P37/R1333 1097
HANSON, R. O. and WATKINS, W. B.

Operating and servicing instructions, Presto Model 8K recorder. Columbia Univ. - Div. of War Research
Feb. 28, 1945 13p.

The Model 8K disc recorder described in this memorandum is used both for recording in the field and rerecording master records at the Laboratory. Certain modifications, therefore, were necessary. The ability to record onboard ship, under conditions of excessive vibration from the engines and rolling and pitching

with the sea, was required. It was also imperative that consistent higher-fidelity recordings be made from the standpoint of decreased amplitude distortion, decreased turntable rumble, and improved frequency response, than was possible with the original Presto Model 8K recorder. Included are curves, drawings, and a photo.

P37/R1334 1098

HANSON, R. O. and BOYERS, J. S.

Two-second tape loop recorder-reproducer set.
Columbia Univ. - Div. of War Research
Feb. 28, 1945 56p.

The 2-s magnetic-tape loop recorder-reproducer set is a unit that will record and reproduce a sample of sound of 2-s duration. A valuable feature of this type of recording is that the material recorded can be reproduced a great number of times without deterioration. Automatic electronic features are included that make it possible to record a complete tape without overlap or serious disturbance at the point of switching. The frequency range is covered in two bands by two separate loops of tape which run at different velocities. The 50- to 5000-cycle band is recorded on a tape loop running at 1 ft per s. The 500- to 25,000-cycle band is recorded on a tape loop running at 4.6 ft per. The recording medium employed is Vicalloy tape, which is 0.002 in. thick and 0.05 in. wide. The electronic and switching equipment is contained in two enclosed racks, one 84 in. high and the other 43 in. high. The loop-recording machine is housed in a separate case and plug connected to the rack equipment. Instructions for operation and maintenance of the unit are included in this

memorandum, together with several illustrations and drawings pertaining to the equipment. These drawings are under separate cover.

P52/R1335 1099

BARKSUN, J. A.

Directional radio sono buoy trainer.
Columbia Univ. - Div. of War Research
May 1, 1945 13p.

With the development of the directional radio sono buoy (DRSB) by the New London Laboratory, it became apparent that, to simulate realistically buoy and receiver operation for classroom instruction, a device would be necessary for training pilots and radiomen in the use and maintenance of the buoy. Development of such an equipment, later known as the DRSB trainer, was begun in April, 1944. Early in October, 1944, the unit was ready for demonstration and test. This trainer produces simulated target signals and recorded background noise, and broadcasts these sounds by means of two frequency-modulation transmitters representing two directional radio sono buoys. The trainee tunes his receiver, reads the target bearing, counts propeller beats, and otherwise operates his equipment just as he would during an actual search. The trainer was sent to the Sono Buoy School at Norfolk, VA, on October 27, 1944. It is now in active use as a training aid at that station.

P37/R1336 1100

HANSON, R. O.

The QFL 75-cycle keying-pulse control unit.
Columbia Univ. - Div. of War Research
Feb. 28, 1945 4p.

The design of the first QFL tactical range recorder teacher was based on the supposition that the first blast of reverberation from the transmitted signal could be used to initiate the range-recorder stylus travel. On this basis, a large number of records were made at sea of typical anti-submarine echo-ranging attacks. This equipment was constructed in breadboard fashion and used in this form for several months. Because it was planned to use this device to rerecord only the initial echo-ranging attack records, which were originally made without the 75-cycle keying pulse, the unit was not made up in permanent form. A drawing is included.

D50/R1337 1101
SNOW, W. B.; ROCKWELL, G. O.; and
ORDING, J. R.

Depth-charge range estimator.
Columbia Univ. - Div. of War
Research
May 21, 1945 15p.

At the request of the submarine forces, as transmitted by the Coordinator of Research and Development, work was undertaken in December, 1943, to develop a means of estimating distances from an exploding depth charge to a submarine. The range estimator, developed as a result of this program, consists of a four-channel amplifier and an associated meter calibrated in range intervals of 0 to 250, 250 to 500, 500 to 1000, and 1000 yd or over. A delay circuit is built into the amplifier so that the meter indicates one of the intervals for a approximate 2-s interval. The amplifier is driven by the output of a standard NL-130 hydrophone. Six prototype models of the DCRE have been built by the Sickles Manufacturing Co. Three of these units were installed on Fleet-type submarines

for tests at New London and Key West. Three models have been shipped to Pearl Harbor for installation and tests at that base. It is understood that, based on the results of tests to date, the Bureau of Ships is initiating procurement of a sufficient number of these devices to equip all operating submarines.

P40/R1338 1102
WESTNEAT, A. S.

Own-course and speed-injector
switching unit.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 4p.

The torpedo data computer instruction room at the New London Submarine Base had need of a unit that would automatically supply own-course and speed information to as many as eight TDC's used for training. This memorandum discusses problems arising in the design and methods to alleviate these problems. A photo and drawing are included.

P63/R1339 1103
WESTNEAT, A. S.

Course-change simulator for
sonar barge.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 7p.

The Training Apparatus Development Group designed a course-change simulator for the COMSUBLANT sonar barge. This unit was designed to receive random-bearing information from a true-bearing change injector and to transmit the simulated gyro-compass bearings and projector bearings to the WCA-2 and WEB equipments. Included are sketches and drawings.

P60/R1340 1104

Preliminary instructions for installing a slip-ring assembly on the QB shaft of WCA-2 sonar equipment.

Columbia Univ. - Div. of War Research

Jan. 29, 1945 20p.

This manual contains excerpts from "Preliminary Instructions for the Installation, Operation, and Maintenance of the Torpedo Detection Modification of the WCA-2 Sonar Equipment," now in preparation. Included is all information pertaining to the preparation and installation of the slip rings. Photos and drawings are included.

P55/R1341 1105

Outlines of lectures on the noise-level monitor and cavitation indicator (for instructors).

Columbia Univ. - Div. of War Research

Feb. 23, 1945 7p.

These lecture outlines are based on experience of members of the Laboratory staff in teaching the use of the noise-level monitor and cavitation indicator. They are distributed to help submarine-training activities in establishing similar instruction for sonar personnel. Slides and an enlarged schematic diagram are provided with the outlines. When equipment becomes available for training purposes, additional material will be distributed to provide actual drill in operating the equipment.

G12/R1342 1106

SNOW, W. B.; FOLLIN, J. W.; ROCKWELL, G. O.; SAWYER, C. R.; VAN LENNUP, D. W.; and SHEA, T. E.

Tests adopted by the hydrophone standards committee, July 10, 1944.

Columbia Univ. - Div. of War Research

Jan. 27, 1945 4p.

Tests were made on experimental and prototype magnetostrictive hydrophones and their accessories, designed or constructed in this Laboratory. A minimum of two units are to be tested before production of any model is started, the actual number to depend on the application of the device and the number of units available. The tests included acoustical measurements, electrical tests, and mechanical tests.

D51/R1343 1107

STEPHENSON, R. G.

Electrical range solver.

Columbia Univ. - Div. of War Research

Feb. 28, 1945 9p.

This memorandum discusses a simple range solver involving few mechanical parts that would satisfactorily solve the range for the triangulation-listening-ranging system. Described herein is the method of operation and tests of the solver. The solver was designed to work simultaneously with the Sperry Gyroscope Co. mechanical solver. Included are photos and drawings.

D16/R1344 1108

WAGNER, R. A.

Modified expendable radio sono-buoy for land noise pickup.

Columbia Univ. - Div. of War Research

Feb. 5, 1945 8p.

A brief preliminary investigation of the feasibility of using modified Radio Transmitting Equipments, AN/CRT-1B (expendable radio sono-buoys) on land to pick up and transmit the noise of highway traffic is discussed in this memorandum. The main part of the investigation was limited to determining the equipments' ability to pick up the required intelligence at the requisite

acoustic ranges, over varying types of terrain, and under a wide range of background-noise conditions. A very brief investigation of radio ranges over land was made, in conjunction with Army personnel and an Army aircraft made available for the purpose. Photos and a contour map are included.

P65/R1345 1109
ELLISON, J. V.

Multi-pen chemical range recorder.
Columbia Univ. - Div. of War Research
Jan. 31, 1945 3p.

After consideration of the advantages and limitations of existing types of range recorders found in sonar systems, it was recognized that their performance is unsatisfactory when used for single-ping echo ranging from submarines. Development was begun on a modification of the Sangamo chemical range recorder to equip it with a number of pens, or styli, that would accommodate signals having a wide range in amplitude. A further aim was to improve the accuracy of range measurements. A drawing is included.

P60/R1346 1110
HOFF, H. B. and SCHELL, F. T.

Self-noise measurements with QB transducer, with and without streamlined dome, USS THORNBACK. Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

This report discusses previous measurements and tests of the torpedo detection modification (TDM) to submarine-sonar equipment (WCA-2), conducted aboard the submarines CAIMAN and SEA FOX, that indicated an undesirable limitation in detection ranges abaft the beam due to high noise levels in that

sector at speeds in excess of 9 to 10 knots. It was suggested that the primary source of these high noise levels might be cavitation or turbulence about the QB transducer. To determine the possibility of eliminating any such source of noise, it was deemed desirable to conduct a series of comparative tests, with and without a streamlined dome installed on the QB transducer of a submarine. Numerous curves and drawings are included.

P33/R1347 1111
GRAHAM, W. F.

Noise output of Mark XX electric torpedo.
Columbia Univ. - Div. of War Research
Feb. 13, 1945 3p.

On January 31, 1945, the noise output of the Mark XX electric torpedo in the band from 24.0 to 24.5 kc was measured at the Gould Island Range of the Naval Torpedo Station, Newport, RI. Curves and diagrams are included.

D55/R1348 1112
CRAIN, H. M.

GTT installation and operation. Columbia Univ. - Div. of War Research
Feb. 8, 1945 5p.

This report discusses generated target tracking (GTT), which provides a means of injecting generated rate of change of bearing signals from the torpedo data computer into the training-control circuit of the JT system. Drawings are included.

D55/R1349 1113
Specification for generated
target tracking switching unit.
Columbia Univ. - Div. of War
Research
Feb. 10, 1945 9p.

This specification covers the
mechanical, electrical, and
performance requirements of the
generated target tracking switching
unit for use with JT sonar
equipment. Photos, a parts list,
and drawings are included.

D26/R1350 1114
PERINE, W.
Attack directors.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 6p.

This completion report outlines
the program of the New London
Laboratory in supervising,
coordinating, and appraising the
work done on attack directors. The
directors examined were
manufactured by the Barber-Colman
Co., the Armour Research
Foundation, and the General
Electric Co. The General Electric
device was renamed anti-submarine
attack plotter (ASAP). Complete
descriptions of the equipments are
not presented in this report. A
list of reports and memoranda,
which cover the systems in detail,
is given in the bibliography. The
attention of the reader is directed
particularly to New London
Laboratory Report D26.2 3947, "Als
Attack Directors."

D10/D29/R1351 1115
KITREDGE, C. P.
Fast-sinking depth charges
Columbia Univ. - Div. of War
Research
May 21, 1945 17p.

This report describes briefly
the work of the New London

Laboratory in the development of
fast-sinking depth charges. The
project was particularly active
from September 1941 until July
1943, with a lesser degree of
activity from the latter date until
April 1944, at which time the
project was terminated. Reference
is made in the text to New London
Laboratory Report P16/3023, "An
Investigation of the Hydrodynamics
of Underwater Projectile Forms,"
which presents a comprehensive
description of the development work
of the Laboratory on fast-sinking
depth charges from the start of the
work until early in 1943, when the
fundamental studies were
completed. A brief summary of the
nature of this hydrodynamic
investigative work is given in
section II of this completion
report.

G13/R1352 1116
THURAS, A. L.
Underwater-sonic loudspeaker.
Columbia Univ. - Div. of War
Research
Apr. 24, 1945 9p.

This report presents a
description and the theoretical
aspects of an underwater-sonic
loudspeaker developed at the New
London Laboratory. The development
of this loudspeaker was done under
the general project covering
magnetostriuctive-hydrophone
development and has only reached
the preliminary design stage. Two
models have been built, one plastic
covered and one rubber covered, and
tentative tests have been made.
However, because little conclusive
test data were obtained in these
tests, no appraisal of the relative
merit of the two models is
attempted in this report.

G27/R1353 1117
HARRIS, W. T.; EDWARDS, P. B.; and
VAN LENNEP, D. W.

Permanent-magnet sonic
projectors.
Columbia Univ. - Div. of War
Research
Feb. 11, 1945 14p.

This report discusses three
broadband magnetostrictive
transducers of the toroidally wound
permanent-magnet type that have
been constructed for use as
projectors in underwater
telephony. They are designed for
use in the 8- to 12-kc single-side
band system at 500-W input from a
source of 300- ohms impedance at 8
kc. Performance characteristics
are outlined on the attached
curves. Photos and diagrams are
included.

P40/R1354 1118
CHIPMAN, L. E.

Echo-pulse generator for sound
injector, conning-officer attack
teacher.
Columbia Univ. - Div. of War
Research
Feb. 9, 1945 7p.

Discussed in this memorandum is
the echo pulse generator that was
designed and built as a part of the
sound injector of the conning
officer attack teacher. The
junction of the unit is to produce
signals that, when fed to the 755
receiver, simulate reverberations
and echo heard in actual
echo-ranging operations. Included
are photos and drawings.

D50/R1355 1119

Outline of instruction on the
depth-charge direction indicator
(for instructors).
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 5p.

This outline and the
accompanying slides are furnished
to help submarine training
activities establish instruction in
the use and maintenance of the
depth-charge direction indicator.
Many boats are now equipped with
DCDI, and installation on all Fleet
boats is continuing at a rapid
pace. A DCDI unit, including
blastphones and amplifier-indicator,
is essential for complete
instruction. At least one pair of
blastphones should be connected to
the amplifier-indicator so that
their opposing action can be
demonstrated by tapping either
phone lightly.

D55/R1356 1120
LUCAS, J. C.

JT installation and maintenance
training.
Columbia Univ. - Div. of War
Research
Feb. 27, 1945 2p.

Between January 8 and January
30, 1945, two 8 day training
programs on problems of JT
installation, maintenance, and
operation were conducted at the
Laboratory. The personnel under
instruction included nine RCA field
engineers, who will assist in the
installation and maintenance of the
JT equipment at the various
submarine bases. In addition,
instruction was given to six Navy
instructors from the submarine-
sonar maintenance school at the
Submarine Base.

D55/R1357 1121
LUCAS, J. C. and LARSON, R. O.

JT training of operators and
maintenance men.
Columbia Univ. - Div. of War
Research
Feb. 13, 1945 2p.

This memorandum describes the training of operators and maintenance personnel in the use of JT sonar equipment.

P62/R1358 1122
ROCKWELL, G. O.

Hydrostatically detonated exploder.
Columbia Univ. - Div. of War Research
March 6, 1945 6p.

Work was undertaken by the New London Laboratory in August, 1944, to develop a device for use by the Woods Hole Oceanographic Institution to generate explosions at depths of several thousand feet below the surface of the ocean. The detonating device described in this report is the initial unit in a program to develop a type of ordnance for this special use. A design of a single-shot exploder was completed and 15 units were manufactured by the New London Laboratory. Two of these units were tested in 1500 fm of water and functioned satisfactorily. Three units were shipped to the Bureau of Ordnance for inspection and preliminary tests. The remaining 10 units were tested onboard CGR VALOR (3080). Arrangements were made by USN/USL with a manufacturer for the construction of 110 units, which will be delivered to the Bureau of Ordnance for tests. The project will be continued further to provide a multiple-unit exploder designed to control the time intervals between individual explosions.

D55/R1359 1123
LUCAS, J. C.

JT training program for EFSG personnel
Columbia Univ. - Div. of War Research
Feb. 13, 1945 2p.

Between 22 January and 12 February, 1945, instruction was given to six U. S. Navy Ensigns, members of the Electronic Field Service Group. The instruction given to this group covered all phases of JT installation, maintenance, and operation, plus some training in general submarine operation and procedure. This memorandum outlines the subjects discussed.

P37/R1360 1124
BOYERS, J. S.

The effect of recorded level on the frequency response of a magnetic-wire recorder.
Columbia Univ. - Div. of War Research
Feb. 28, 1945 4p.

Although considerable information concerning magnetic-wire recording has been published, a rather important and interesting phase of the work, which has so far been largely overlooked, is the variation of frequency response of the system with recorded level. This report discusses the tests conducted and shows frequency responses, which indicated many variations. No conclusions as to the cause of the variations have been reached to this date.

P60/R1361 1125

Operator's manual for the torpedo-detection modification of the WCA-2 equipment.
Columbia Univ. - Div. of War Research
Mar. 1, 1945 8p.

This manual discusses the torpedo detection modification (TDM) that is applied to the QB part of the WCA-2 sonar equipment. Its purpose is to aid a surfaced submarine in detecting an approaching torpedo and determining

its relative bearing. Outlined are the three principal modifications in the WCA-2.

P40/R1361-A 1126
SCHAFFER, W. G.

Mk I TDC modification for use with Submarine Attack Teacher, Mk I, conversion.
Columbia Univ. - Div. of War Research
Feb. 15, 1945 4p.

This report discusses the modified Mk I submarine attack teacher which uses two rebuilt Mk I torpedo data computers to generate the problem. Only one TDC is used at any given time, the other being a standby unit for service protection. One TDC is furnished at the time of installation of the conversion equipment and the second TDC is to be shipped at a later date and added to the attack teacher at that time. Attached are drawings and diagrams.

P37/R1362 1127
JACOB, W. P. and HANSON, R. O.
USL rerecording channel at Muzak Corporation.
Columbia Univ. - Div. of War Research
Mar. 1, 1945 v.p.

The New London Laboratory rerecording equipment located at the Muzak Corp. in New York City, is used for dubbing from acetate to wax masters to facilitate high-quality record processing. This report discusses the rerecording parts with photos, diagrams, and drawings, as well as frequency curves.

D28/R1363 1128
KITTRIDGE, C. P.

Surface-craft dispensers for fast-sinking depth charges.
Columbia Univ. - Div. of War Research
Apr. 30, 1945 24p.

This report describes the development of two types of surface-craft dispensers for fast-sinking depth charges. The work was started at the New London Laboratory early in 1942 at the request of the Bureau of Ordnance, and was, in effect, a corollary to the work done by the Laboratory on the development of fast-sinking depth charges. Two types of dispensers, the power-operated, or twin-screw type, and the gravity type are described. The former was designed primarily as a test instrument for use in depth-charge launching trials, while the latter was developed with the view to subsequent production. A bibliography of reports and memoranda pertaining to this project is appended to this report.

D28/R1364 1129
KITTRIDGE, C. P.

Depth-charge intervalometer.
Columbia Univ. - Div. of War Research
May 17, 1945 22p.

The New London Laboratory has developed an intervalometer, which is an electronic timer to release automatically depth charges in predetermined patterns. The work was a corollary to that done on fast-sinking depth charges and the associated release gear. The intervalometer can be used with almost any combination of depth-charge tracks and K-guns. A battery-operated model was completed in May, 1943, and was used

for demonstration purposes. Two intervalometers suitable for service use have been constructed and delivered to the Navy.

P37/R1365 1130
HANSON, R. O.

Sound recording at the New London Laboratory.
Columbia Univ. - Div. of War Research
May 23, 1945 71p.

This report describes the work of the New London Laboratory Sound Recording Dept. from the time of its organization in January, 1942, until the present date. Although originally it was thought that the primary function of the department would be to reproduce, in the Laboratory, phenomena and tests previously recorded in the field, the recording techniques adopted or developed by the Laboratory have had many other valuable applications to the development and training programs not originally contemplated. Brief discussions of these applications, together with descriptions of recording equipment design and design modification work carried on by the Laboratory are included in this report. References to more complete descriptions are given in a list of references.

D55/R1366 1131
REED, F. C.

Field tests, RLI clipper-amplifier system.
Columbia Univ. - Div. of War Research
Feb. 20, 1945 2p.

This report discusses the results of field tests on the RLI clipper-amplifier system described in Memorandum for File P35/R1265 - 1034. The points outlined are presented as a result of a limited number of field observations, both in live and artificial target-sound

fields. It is felt that further consideration of the system is warranted. These tests were conducted onboard USS YP-253 between Nov. 1, 1944 and Jan. 15, 1945.

P37/R1367 1132
HANSON, R. O. and SAARS, W. F.

Modification of Presto Model L-3 transcription playbacks for use with JP-1 equipment.
Columbia Univ. - Div. of War Research
Feb. 27, 1945 20p.

As the JP-1 training program progressed, it became apparent that the ability to reproduce certain types of underwater-sound recordings through the JP-1 amplifier, itself, would not only be more realistic but would facilitate the training of operators in the use of this gear. Discussion of the requirements of a record playback to accomplish this purpose resulted in Memorandum for File P37/R1015-800, entitled "Suggestions for a Hi-Fidelity Phonograph Playback Suitable for Reproducing Recordings of Underwater Sound". At the request of the Training Group, a survey of playbacks readily available was made and some preliminary work was done the result of which was the decision to use the Presto type-L portable reproducer modified to meet the required specifications. Diagrams, curves, and photos are included.

D16/R1368 1133
FISH, P. E.

Expendable radio sono buoy, use with echo-ranging equipment.
Columbia Univ. - Div. of War Research
Feb. 20, 1945 4p.

This memorandum discusses tests that were conducted by ASDEVLAN T

at Fort Lauderdale, FL, to determine the extent of usefulness and limitations of echo ranging on the sono-buoy. The tests showed that contact could be held to the limit of radio reception from the buoy. Ranges to which sound contact was held on the buoy were, in effect, radio-reception ranges and varied with antenna installation and target angle of the ship as seen from the buoys' position.

P60/R1369 1134

Outline of training in the use of torpedo-detecting modification of WCA-2 equipment (for instructors).

Columbia Univ. - Div. of War Research
Feb. 28, 1945 6p.

This material is distributed to help submarine-training activities to establish instruction in the use of the torpedo-detection modification. The periods outlined are (1) lecture on TDM, (2) lecture demonstration of maintenance, and (3) operating instruction underway. Training of officers should include periods 1 and 3. Sonar operators and sonar technicians should take all three periods. Slides are included.

D34/R1370 1135
RIPKEN, J. F.

Notes on DRSB mechanical deficiencies based on observations at Fort Lauderdale.

Columbia Univ. - Div. of War Research
Feb. 22, 1945 3p.

This report constitutes a brief summary of suggested mechanical design or production changes to the DRSB unit which may lead to improved field performance. The suggestions represent personal reactions to examinations of

approximately 110 units retrieved in tests conducted at Fort Lauderdale, FL, in January and February, 1945. The proposed changes have been limited to those that might be accomplished without major redesign and that, in many cases, are believed to be currently in process.

P33/R1371 1136
BERRY, A. M.; JEZIERSKI, E.; and
RUSSELL, V. P.

Physical characteristics of quick dives made by USS QUEENFISH. Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

This memorandum presents an analysis of the physical characteristics of a series of quick dives made by the modern Fleet-type submarine USS QUEENFISH (SS-393) in terms of the variation with time of the keel depth, rate of depth change, speed, and acceleration of the submarine. This information may be of value to submarine-planning engineers. Numerous curves and maneuvering boards are included.

D51/R1372 1137
REED, F. C.

Minutes of TLR conference, February 15, 1945. Columbia Univ. - Div. of War Research
Feb. 24, 1945 5p.

This report is a record of the minutes of a conference on Feb. 15, 1945, called for the purpose of discussing and determining the design of an experimental electronic system for USS YP-253, the proposed system to be used in the future TLR program.

G12/R1373 1138
HARRIS, W. T. and EDWARDS, P. B.
A new end-fitting design for
NL-124 and NL-130 hydrophones.
Columbia Univ. - Div. of War
Research
Feb. 24, 1945 4p.

This memorandum discusses a new
end fitting design proposed, to
substitute brass and bakelite for
the present polystyrene
construction. For insulation and
lack of water absorption, the
polystyrene fitting is superior.
It is also more economical to
manufacture. The new construction
proposed is adequate in the above
respects, involves tested
techniques, and has the advantage
of being more rugged mechanically,
especially with regard to the
threads in the gland. Sketches are
attached.

P63/R1374 1139
WOODWARD, L. A.
Instructions for operation and
maintenance of the artificial sound
source.
Columbia Univ. - Div. of War
Research
Feb. 27, 1945 12p.

The Listening Group has been
requested by the Training Group to
provide an artificial sound source
to be used on USS MARABOUT (AMc50).
This report provides instructions
on the operation and maintenance of
this equipment. Included are
drawings and curves.

D16/R1375 1140
CARPENTER, T. H.
Investigation of added
visibility for AN/CRT-1A ERSB
equipped with electric-light marker.
Columbia Univ. - Div. of War
Research
Feb. 27, 1945 6p.

This report discusses results
of a comparison of visibility of a
light marker mounted on a standard
buoy with that of a light marker
mounted on a buoy with a painted
top deck. Also discussed is a
recommendation of suitable paint
and methods of application to ERSB
production. A summary of results
is provided, as well as photos.

D20/R1376 1141
An improved echo-ranging
receiving equipment.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 32p.

This completion report
discusses developments in the field
of echo ranging which, prior to the
war, had succeeded in reducing this
means of submarine detection to a
practical science, the effective
utilization of which promised to be
of great importance in the
prosecution of anti-submarine
warfare. The New London Laboratory
design, although never reaching the
production stage as a replacement
unit as originally planned,
nevertheless served a most useful
function in guiding the development
of equipment for installation on
new ships. As of January 1945, the
Navy had placed orders with the
Submarine Signal Co. and the RCA
Manufacturing Co. for 253 units of
the type QGA equipment and 500
units of the QGB system. Of these,
114 units of QGA and 480 units of
QGB equipment had been delivered by
that date.

P61/R1378 1142
OSGOOD, S. W.
Tryout of the propeller-noise
discrimination meter at the West
Coast Sound School.
Columbia Univ. - Div. of War
Research
N.D. v.p.

The purposes of this memorandum are (1) to obtain preliminary data on the propeller noise discrimination meter from samples of men already selected as sound students and for whom validation data would later be available; (2) to ascertain the range of student performance on the meter, using a given testing technique; and (3) to obtain data concerning the reliability of the instrument as a testing device. The memorandum also includes a drawing of the device.

P33/R1379 1143
GRAHAM, W. F.

Equipment developed and used on the AMADA for underwater-sound investigation.
Columbia Univ. - Div. of War Research
Feb. 28, 1945 22p.

The motor yacht AMADA, converted for Laboratory use in 1942, is particularly well suited for its purpose, in regard to laboratory space and laboratory equipment. The boat and its associated equipment have facilitated a large amount of work that has been done on listening studies and on miscellaneous other tests conducted by, or in association with, the Laboratory. A considerable variety of electronic, sound-measuring, and testing equipment is used in the work, but most work programs centered around the magnetic-tape recorder and the BTL 1-K sound projector. By these means, it was possible to project continuously all types of artificial underwater sound for listening purposes on AMADA, itself, or on other ships cooperating in the work. Included are diagrams, curves, and photos.

P43/R1380 1144
BARKSON, J. A.

Keyway-cutting fixture for periscope night-lighting installation.
Columbia Univ. - Div. of War Research
Feb. 28, 1945 16p.

This memorandum transmits drawings covering a tool designed by this Laboratory to facilitate the operation of cutting a keyway in periscopes to which night-lighting units are to be added. This memorandum is issued for record purposes and to facilitate the transmittal of, and reference to, drawings covering this device.

P35/R1381 1145
REYNOLDS, A. T.

High-frequency bridge detector.
Columbia Univ. - Div. of War Research
Feb. 28, 1945 3p.

This memorandum describes a heterodyne-type meter-indicating bridge detector that is of the cathode-follower input type and consists of a gain control, a 150-kc low-pass filter, a balanced modulator, a 210- to 350-kc oscillator, a two-stage 200-kc selective amplifier, and a reverse reading vacuum-tube voltmeter. This type of meter circuit was desirable, since it cannot be damaged by accidental overload. Drawing No. 20866 BE is attached.

D50/R1382 1146
ORDING, J. R.; PERRY, G. R.; HUFF, H. B.; and COLE, D. L.

Supplement to "Depth-Charge Range-Meter Tests" (D50/R1222-991 and D50/R1285-1052).
Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

This memorandum describes a series of tests conducted on the production models of the depth-charge range estimator previously called the depth-charge range meter. This is illustrated in figures 1 and 2. A schematic drawing of the circuit employed is shown in figure 3, with an accompanying explanation in appendix A. This memorandum supplements D50/R1222-991 and D50/R1285-1052.

P61/R1383 1147
OSGOOD, S. W.

Tryout of the target-discrimination test records at the West Coast Sound School. Columbia Univ. - Div. of War Research
Feb. 28, 1945 3p.

The purpose of trying out the target-discrimination test was to obtain data from samples of men already selected for sonar training, and for whom validation data would later be available. Other purposes were to ascertain the range of individual performance on the test and the obtain data concerning the reliability of the test. The test is described and the results are given.

P26/R1384 1148
Preliminary installation, adjustment, maintenance instructions for Model QFM tactical range-recorder teacher. Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

The Model QFM tactical bearing recorder teacher is used for the instruction of submarine sonar operators in the use of the bearing-range-recorder of the torpedo detection modification of WCA-2 sonar gear. It reproduces typical torpedo traces and the associated sounds. This manual

describes separately the installation, adjustment, and maintenance of the equipment.

P33/R1385 1149
SNOW, W. B. and HOFF, H. B.
Surface self-noise measurements on USS BOARFISH WCA-2 equipment. Columbia Univ. - Div. of War Research
Feb. 28, 1945 4p.

This memorandum describes the results of surface self-noise measurements made on the 755 receiver and QB transducer of USS BOARFISH by personnel of the Laboratory during the month of October, 1944. The purpose of this test was to coordinate observations on the bow waves with noise measurements at various speeds to determine whether the rapid rise of noise level in the vicinity of 10 knots and the broad noise patterns observed previously on other submarines is associated. The results are given and conclusions drawn.

P35/R1386 1150
MODE, D. E.
A survey of RLI electronic-design considerations for ATF application. Columbia Univ. - Div. of War Research
Feb. 28, 1945 10p.

Many bearing-indicating systems depending for operation on target-signal phase angle have been suggested in the past, and it is the purpose of this report to describe one of them, namely, the RLI equipment. In particular, many of the alternate ways of accomplishing the desired result are discussed and their advantages and disadvantages pointed out. Brief explanations of the operation of some of the circuits involved are included. Certain design changes that may lead to increased

simplicity of both construction and operation, together with suggestions for further field tests and electronic circuit development, are offered.

P60/R1387 1151
HERRNFELD, F. P.
Amplifier for TDM.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 2p.

This memorandum details the development of an amplifier for the TDM system, to be connected between the output of the 755 receiver and the CAN 55171 bearing recorder. This amplifier is of the compression type, compressing an input range of 60 dB into an output range of 13.3 dB, thus increasing the range of the bearing recorder to that of the 755 receiver. It was determined that building this amplifier is a feasible project.

D16/R1388 1152
FISH, P. E.
Directional radio sono-buoy,
use with echo-ranging equipment.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 6p.

Tests were continued by ASDEV LANT at Fort Lauderdale, FL, to determine the distance to which range readings can be obtained and bearing accuracy when echo-ranging on the directional sono-buoy. These tests were made onboard USS JORDAN (DE-204) using QCT-1 sonar equipment. Diagrams describing the method of attaching a T-2 marker to the DRSB and the coupling network used during tests are included.

P49A/R1389 1153
Fundamentals of radar.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 6p.

This manual describes the basics of radar (radio detection and ranging). A brief summary of the radar set in operation is also included.

D50/R1390 1154
Specification for Model NL-146
depth-charge range estimator.
Columbia Univ. - Div. of War
Research
Mar. 29, 1945 21p.

This specification covers the manufacturing requirements for a Model NL-146 depth charge range estimator, herein referred to as the DCRE. This unit is to be used to measure the amplitudes of the initial pressure fronts generated by depth-charge explosions. Parts lists, curves, photos, and drawings are included.

D50/R1391 1155
Specification for DCRE
calibrator.
Columbia Univ. - Div. of War
Research
Apr. 2, 1945 6p.

This specification covers the manufacturing requirements for a DCRE calibrator. This device is to be used in adjusting the range intervals of the DCRE by simulating the pulse generated in the hydrophone by an initial pressure front from a depth-charge explosion. Included are photos, parts lists, and drawings.

D34/R1392 1156
BARKSON, J. A.
DRSB plotting board.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 2p.

This memorandum is issued for record purposes to cover the construction of a triangulation plotting board proposed for use in fixing the location of a submarine from direction readings obtained by means of two directional radio sono-buoys. A photo is included.

P37/R1393 1157
BARKSON, J. A.
Motor-driven cam-operated variable attenuator for recording purposes.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 7p.

This memorandum briefly describes the drawings and photographs covering a motor-driven cam-operated variable attenuator built for recording purposes. Specifically, this attenuator was built to enable the production of records simulating recordings taken onboard ship from torpedo-detection modification equipment during the approach of a torpedo. The attenuator can also be used for the production of records simulating those obtained over a directional radio sono buoy system of a submarine under way. Photos and curves are attached.

D50/R1394 1158
Preliminary installation and maintenance instructions for the depth-charge range estimator.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 40p.

This manual discusses the use of the depth charge range estimator (DCRE), which is an equipment for determining the range of a depth-charge explosion with respect to a submerged submarine to enable the planning of escape. Photos and drawings are included.

D56/R1395 1159
HERRNFELD, F. P.
An 8.2-kc single sideband underwater-telephone system.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 5p.

After the development of the 25- 1 to 28-kc single sideband suppressed-carrier telephone transmitter described in Memorandum for File D56/R1268-1037, which has a directive projector and hydrophone, it was felt that a system using a projector of nondirective properties would have certain advantages in establishing contact between submerged submarines. The JT equipment soon to be installed on all submarines is capable of receiving single sideband suppressed-carrier transmission down to 8 kc, and the RLI feature would greatly simplify the problem of keeping the hydrophone trained on the source. A curve and drawing are included.

P49A/R1396 1160
SD-5 radar gear and procedure for starting SD-5 radar gear.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 22p.

This manual describes the use of the SD-5, one of the simplest forms of radar gear, which is carried on American submarines as a warning system against the approach of enemy aircraft. This gear is ordinarily installed in the conning tower and is secured when the boat

is submerged. Included is a preliminary checklist of the procedure for starting the SD-5 gear.

P28/R1398 1161
PERRY, G. R.

The influence of thermal gradients on relative sound intensities with special reference to the depth-charge range estimator. Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

The contemplated use of the depth charge range estimator in Western-Pacific operations led to a survey of thermal conditions typical of this region, with an investigation of relative sound intensities accompanying such conditions. Such knowledge would help to interpret and predict any inconsistencies in the readings of this instrument. Numerous curves and diagrams are included.

P48/R1399 1162
HERRNFELD, F. P.
Propeller-beat generator. Columbia Univ. - Div. of War Research
Feb. 28, 1945 8p.

This memorandum discusses the propeller-beat generator, an important part of the sound injector for the submarine-attack teacher. From the tests conducted at the Submarine Base in New London, it became apparent that certain changes in the design were necessary. This report discusses the changed unit and includes drawings and photos.

D57/R1400 1163
ALLEMAN, R. S.
Supplement to "Correction of ping transient of WCA-2 QB driver," D57/R1152. Columbia Univ. - Div. of War Research
Feb. 28, 1945 2p.

This memorandum discusses wiring modifications as a supplement to report D57/R1152-927. A figure indicating parts locations and wiring changes is included.

D55/R1401 1164
Operator's manual for the Model JT sonar equipment. Columbia Univ. - Div. of War Research
Feb. 28, 1945 16p.

This manual describes the use of the JT sonar equipment, which is a development from the JP topside-listening gear. JT operates most efficiently at low ship speeds. At higher speeds, interference from water noise and own-ship's noise reduces the obtainable ranges. Photos and diagrams are included.

P21/R1402 1165
JENKINS, W. L.
Model QFL tactical range-recorder teacher. Columbia Univ. - Div. of War Research
May 9, 1945 13p.

The Model QFL tactical range-recorder teacher is a device for training sound range-recorder operators. Operated by phonograph recordings of echo-ranging sounds, the equipment produces recorder traces and the accompanying sounds with a high degree of realism. Five or more students can be trained at a time, manipulating the controls and interpreting the traces as they would in an actual attack on a submarine. Three

models of the equipment were developed by CUDWR, the third model serving as a manufacturer's prototype for production units. A total of 63 units have been produced by USN/USL. All important ASW training activities have been equipped with one or more of these devices. A complete service of recordings provides drills at increasing levels of difficulty. Directions on the recordings and suitable instruction manuals make it possible to conduct the drills without the services of an expert instructor.

P48/R1403 1166
HERRNFELD, F. P.

Electrical tests and alignment procedure of the sound injector. Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

This report describes the electrical tests and alignment procedure for the sound injector. Graphs, photos, and drawings are included.

D51/R1404 1167
LODA, C. J.

Summary of work on JAA (TLR) project. Columbia Univ. - Div. of War Research
Feb. 28, 1945 3p.

This report summarizes the status of work, past and pending, on the JAA (TLR) project and discusses some factors on which further investigation is recommended. The JAA system will be transferred to USS CONGER (SS-477) to determine how the bearing and range data can be coordinated with other submarine attack and evasion devices and to subject it to patrol experience.

D51/D55/R1405 1168
REED, F. C.

Interference and its effects on the RLI indication. Columbia Univ. - Div. of War Research
Feb. 28, 1945 v.p.

The accuracy and character of an RLI indication is affected by the presence of a foreign signal or signals within the sound field of the hydrophone. The dimensions of this field determine the nature and magnitude of the effects of interference and are herein determined for the 5- 1 to 9-kc and 9- 1 to 16-kc noise bands using a 5-ft NL-124 type hydrophone and an NL-129-A baffle.

The results predicted are approximate, but useful, and provide information as to the nature and extent of these interfering effects.

P48/R1406 1169
ROSS, B. M.

Sound injector, construction of additional units. Columbia Univ. - Div. of War Research
Feb. 28, 1945 29p.

This memorandum deals with the production aspects of the sound injector equipment developed for use with the conning officer attack teacher. It includes several parts lists.

D51/R1407 1170
GONGWER, C. A.

Mechanical features of JAA training system. Columbia Univ. - Div. of War Research
Feb. 28, 1945 7p.

An experimental JAA system was installed on USS S-48. This memorandum describes the JAA system. Each piece of equipment that makes up this system is

described in detail, with references made to drawings which show that piece.

G12/R1408 1171
VAN LENNEP, D. W.
Response versus temperature measurements, AX-58-A hydrophone. Columbia Univ. - Div. of War Research
Feb. 28, 1945 6p.

In February 1944, an attempt was made to determine if the response of the AX-58 series hydrophone was affected by temperature. At that time, no temperature effects were observed. Since that time a memorandum has been received from CUDWR entitled "Calibration of Some AX-58 and AX-58-A Hydrophones" (G12/R5858), which seems to show large and unsystematic temperature effects. Another attempt has been made to detect and measure these temperature effects on BARGE. The test method is described and the results are given.

P33/R1409 1172
MANINGER, R. C.
Fundamental-listening studies at the New London Laboratory. Columbia Univ. - Div. of War Research
May 30, 1945 75p.

This report presents a summary of the experimental-listening studies undertaken by the Fundamental Listening Studies Group of the New London Laboratory, together with an elementary treatment of the theory of underwater listening. The theoretical discussions represent the culmination of ideas and opinions derived from experimental-listening studies carried on by the New London Laboratory and by other OSRD organizations. Reference is made to a large number of documents pertinent to the text, a complete

list of which is appended to this report. Certain recommendations are made for the improvement of underwater-listening systems.

P49A/R1410 1173
SJ-1 radar gear and procedure for starting SJ-1 radar gear. Columbia Univ. - Div. of War Research
Feb. 28, 1945 16p.

The SJ radar gear is carried on submarines along with the SD. The SD is ordinarily used for air search (searching for aircraft targets) and the SJ for surface search (searching for targets on the surface of the sea). Unlike the SD, the SJ gear can be trained about the circle of the compass and it will give extremely accurate bearings as well as accurate ranges. The unit is described and the procedure for starting SJ-1 radar gear is included.

D34/R1411 1174
FISH, P.
DRSB tests at Fort Lauderdale, January-February 1945. Columbia Univ. - Div. of War Research
Feb. 28, 1945 3p.

Eight members of the DRSB group from this Laboratory attended operational tests conducted at Fort Lauderdale, FL, by ASDEV LANT. These tests were planned to explore the possibilities of detecting enemy submarines with the directional radio sono-buoy. In general, it is felt that the trials were successful. Six thousand units are now on order for delivery to the Navy.

G27/R1412 1175
BERRY, A. M. and GARDNER, J. B.
Measurements on QC-JK Submarine
Signal Company projector.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 24p.

This report covers calibration measurements on a combined QC-JK projector, type CBM 78212, which is part of Navy Model WCA-2 echo ranging-listening-sounding equipment manufactured by the Submarine Signal Company of Boston, MA. The WCA-2 sonar equipment includes a combined QC-JK projector and it was designed to test each half of the transducer and compile data on their performance. The CBM 78212 projector embodies a number of improvements in design over the older models, particularly in that permanent-magnet, rather than electrical, polarization is used.

P43/P54/R1413 1176
BARKSON, J. A.
Submarine-periscope night lighting and the submarine-periscope bearing transmitter.
Columbia Univ. - Div. of War Research
May 7, 1945 9p.

The New London Laboratory was requested to study the requirements of an improved lighting system to be used for reading the azimuth scale of a periscope during night attack and to design, build, and install such a system on a submarine for extensive trials. The first unit has been completed, installed, and tested with gratifying results. A periscope bearing transmitter has been developed. This device automatically transmits periscope bearings to the torpedo data computer operator and to other fire-control positions in the submarine.

P63/R1414 1177
GOURLEY, G. M.
COMSUBLANT sonar-radar training barge.
Columbia Univ. - Div. of War Research
Feb. 28, 1945 21p.

The COMSUBLANT sonar-radar training barge is a two-decked 110-ft barge equipped for the training of submarine sonar and radar personnel. Training equipment includes 2 WCA-2 listening echo-ranging equipments, 11 JP-2 and 1 JT installations, 2 Model SJ-1 radars, 2 Model SD-4 radars, 2 BN units, and radio equipment including a TBL series transmitting equipment, a TCP voice transmitter-receiver, and RAK- and RAL-type receivers.

D56/R1415 1178
HORTON, J. W.
Underwater telephony.
Columbia Univ. - Div. of War Research
May 15, 1935 27p.

Studies have been made of the performance of systems designed to provide underwater communication by means of voice-modulated supersonic waves. These have shown that such waves suffer considerably during transmission over the water path. They have demonstrated that the nature of this distortion may seriously impair the performance of systems attempting to use frequency-modulated waves. On the other hand, it has been shown that acceptable performance may be obtained by means of single sideband suppressed-carrier transmissions. Equipment based on these studies has been constructed. Tests have shown this to be capable of maintaining communication out to ranges of 12,000 yd, or, in certain special cases, to beyond 15,000 yd.

P37/R1416 1179
HANSON, R. O.

Operating instructions for
rerecording facilities at the New
London Laboratory.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 v.p.

This memorandum is to provide
operating personnel with adequate
information on the rerecording
equipment that has been built at
the New London Laboratory. Also
included are details of the
vertical recording channel which
has now been disassembled. Photos,
curves, and drawings are attached.
Additional drawings are included
under separate cover.

G12/R1417 1180
SNOW, W. B.

The AX-48-4 ADP crystal
hydrophone.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 5p.

The Brush Development Co. was
authorized to build several crystal
hydrophones 3-ft long by 2 in. in
diameter so that a hydrophone would
be available for the purpose of
successful through-the-hull
mounting. Results of testing,
however, indicated such
inefficiency of this hydrophone
construction as to preclude any
further consideration of it.
Curves are included.

G12/R1418 1181
SNOW, W. B.; FOLLIN, J. W.; and
HARRIS, W. T.

Transducer research and
production at the New London
Laboratory.
Columbia Univ. - Div. of War
Research
May 25, 1945 115p.

This report summarizes the
development of magnetostrictive
hydrophones at the New London
Laboratory by Columbia University -
Division of War Research. The work
at New London has placed major
emphasis on hydrophones for
directional sonic listening and the
instruments have, in general, been
designed for wide frequency ranges
at moderate efficiency rather than
for narrow frequency ranges at high
efficiencies. The material
presented is intended to be
sufficiently complete for those
readers who wish to obtain a
general view of the subject. For
those who desire more detailed
information regarding
magnetostrictive hydrophone theory
and design, many reports and
memoranda have been listed in the
reference section of this report.
A short section is devoted to the
small number of magnetostrictive
projectors developed by the
Laboratory. Short descriptions are
also given of crystal hydrophones
developed for the Laboratory by a
manufacturer, and of the reasons
prompting the developments.

G12/R1419 1182
SNOW, W. B.

Calibrations of three AX-120
hydrophones.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 v.p.

The AX-120 hydrophone is an ADP
crystal adaptation of the Brush
AX-58 series, or RQ-51055
hydrophone. All details except the
crystal cartridge are identical.
The redesign is described and the
calibrations included. The
performance of the AX-120 is
compared to that of the RQ-51055.
Drawings and photographs are
included.

P41/R1420 1183
BARKSON, J. A.
Periscope trainer.
Columbia Univ. - Div. of War
Research
May 21, 1945 v.p.

This report describes the development of a periscope trainer by the New London Laboratory. Design work was started in November, 1943. The periscope trainer has proved to be a useful training aid. It provides a means, not otherwise available, of training in range estimation by the use of the stadimeter. It also makes possible practice in range estimation by the use of telemeter with simulated own ship's roll, and because of accurately simulated conditions, provides valuable supplementary training in recognition and determination of aspect and bearing. Additional features of the trainer are given in the text of this report.

D51/R1422 1184
NOSKER, L. W. and STEPHENSON, R. G.
Discussion of electronic
equipment for TLR system on USS
CONGER.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 20p.

This memorandum contains a discussion of the design considerations involved in the triangulation-listening-ranging equipment that was constructed for installation on USS CONGER (SS-477). Brief comments on the relative merits of certain alternative designs are included.

P52/R1423 1185
DRSB training records.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 14p.

This pamphlet contains information on the contents and use of the directional radio sono-buoy training records. Text of these records is outlined, as well as methods of adapting the records to the training program.

P55/R1424 1186
Outlines of lectures on the noise-level monitor and cavitation indicator (for instructors).
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 6p.

This manual replaces a previous one with the same title, dated Feb. 23, 1945 (P55/R134-1105). These lectures are distributed to help submarine-training activities in establishing similar instruction for sonar personnel. Slides and an enlarged schematic diagram are provided with the outlines.

P55/R1425 1187
The noise-level monitor trainer.
Columbia Univ. - Div. of War
Research
Feb. 28, 1945 16p.

The noise level monitor trainer set up and ready for drill consists of (1) two playbacks and appropriate drill records, (2) a control unit, and (3) a JP amplifier with NLM chassis mounting. Photos, a table of control-unit settings, diagrams, and a parts list are included.

P60/R1427 1188
HORTON, J. W.; GRAF, V. V.; and
SCHELL, F. T.
The WCA-2 torpedo-detection
modification.
Columbia Univ. - Div. of War
Research
May 28, 1945 16p.

Work was undertaken to develop a means of detecting sonically the noise of enemy torpedoes that might be fired at our submarines while the latter are operating on the surface at speeds ranging from 8 to 15 knots. The work has consisted of modifying the WCA-2 equipment on submarines so that the QB projector can be rotated at a constant speed of 12-1/2 rpm for several consecutive hours, thus providing aural detection through the 755 receiver-amplifier. Also, means have been provided for the visual recording of the relative bearings of approaching torpedoes through the use of a Sangamo range recorder, modified to indicate bearing rather than range. Components for 265 kits are being procured and the kits are being assembled by USN/USL. Of this number, more than 40 kits have been shipped as of the date of this report.

P35/R1428 1189
HERRNFELD, F. P. and SNOW, W. B.
Electronic design and measurements at the New London Laboratory.
Columbia Univ. - Div. of War Research
May 28, 1945 v.p.

This summary report is a catalog of the devices and methods that are thought to be of interest to users or designers of electronic equipment. The electronic features of the items are described briefly and references to record numbers, drawings, and memoranda are given that will expedite the location of further particulars if they are desired.

D51/R1429 1190
SAWYER, C. R.
Submarine triangulation-listening-ranging system.
Columbia Univ. - Div. of War Research
May 28, 1945 47p.

The triangulation-listening-ranging system (TLR) consists essentially of two listening stations a known distance apart onboard a submarine. Accurate target bearings from these two stations can be translated into range by triangulation. The equipment for training the listening hydrophones and for computing range was developed by the Sperry Gyroscope Company under a Laboratory subcontract. The remainder of the equipment, consisting of sonic amplifiers and electronic units for obtaining highly accurate bearings, was developed at New London. After preliminary studies, a complete TLR system was installed on USS S-48 in May 1944. As result of favorable performance on this boat, the Navy requested that the system be modified and installed on USS CONGER, in February 1945, for appraisal under patrol conditions.

D41/R1430 1191
STEPHENSON, R. G. and REED, F. C.
Investigation of Subsight for Mousetrap fire control.
Columbia Univ. - Div. of War Research
Feb. 28, 1945 35p.

This memorandum summarizes the progress made at the New London Laboratory in the investigation of Subsight and the adaptation of this system to Mousetrap fire control. As a result of initial development at the University of California, Division of War Research, at San Diego, Subsight had evolved by the end of 1942 to a point at which it gave such promise that information

on its performance under conditions representative of the proposed application seemed advisable. It was largely owing to the availability of submarine facilities at New London that this Laboratory was selected to conduct the necessary tests. Tests were run on all aspects of a submarine at both 6- and 10-knot attack speeds. Consideration was first given only to the quality of the signals; later subcaliber Mousetrap projectiles were fired as a means of evaluating the accuracy of the Subsight indications.

G34A/R105 -
G34A/R706

1192-A - 1192-LL

Biweekly Reports from Nov. 17, 1942, to Apr. 15, 1944.
Columbia Univ. - Div. of War
Research
38 reports

The following are biweekly reports of projects conducted at the Columbia University, Division of War Research, New London, CT, from the Nov. 17, 1942, to Apr. 15, 1944.

Report No.	Period Covered	Report Date
G34A/R105-1192-A	11/02/42 - 11/14/42	11/17/42
G34A/R114-1192-B	11/16/42 - 11/28/42	12/01/42
G34A/R126-1192-C	11/30/42 - 12/12/42	12/15/42
G34A/R134-1192-D	12/13/42 - 12/26/42	12/30/42
G34A/R142-1192-E	12/27/42 - 01/09/43	01/13/43
G34A/R157-1192-F	01/11/43 - 01/23/43	01/25/43
G34A/R159-1192-G	01/25/43 - 02/06/43	02/10/43
G34A/R171-1192-H	02/08/43 - 02/20/43	02/24/43
G34A/R185-1192-I	02/22/43 - 03/06/43	03/10/43
G34A/R223-1192-J	03/08/43 - 03/20/43	03/24/43
G34A/R253-1192-K	03/22/43 - 04/03/43	04/07/43
G34A/R286-1192-L	04/05/43 - 04/17/43	04/21/43
G34A/R316-1192-M	04/19/43 - 05/01/43	05/05/43
G34A/R332-1192-N	05/03/43 - 05/15/43	05/19/43
G34A/R363-1192-O	05/17/43 - 05/29/43	06/02/43
G34A/R393-1192-P	05/31/42 - 06/12/43	06/17/43
G34A/R405-1192-Q	06/14/43 - 06/26/43	06/30/43
G34A/R423-1192-R	06/28/43 - 07/10/43	07/14/43
G34A/R449-1192-S	07/12/43 - 07/24/43	07/29/43
G34A/R469-1192-T	07/26/43 - 08/07/43	08/12/43
G34A/R484-1192-U	08/09/43 - 08/21/43	08/26/43
G34A/R500-1192-V	08/23/43 - 09/04/43	09/09/43
G34A/R522-1192-W	09/06/43 - 09/18/43	09/23/43
G34A/R538-1192-X	09/20/43 - 10/02/43	10/06/43
G34A/R556-1192-Y	10/04/43 - 10/16/43	10/20/43
G34A/R558-1192-Z	10/18/43 - 10/30/43	11/03/43
G34A/R600-1192-AA	11/01/43 - 11/13/43	11/17/43
G34A/R601-1192-BB	11/15/43 - 11/27/43	12/02/43
G34A/R602-1192-CC	11/29/43 - 12/11/43	12/16/43
G34A/R603-1192-DD	12/13/43 - 12/25/43	12/30/43
G34A/R604-1192-EE	12/27/43 - 01/08/44	01/14/44
G34A/R605-1192-FF	01/10/44 - 01/22/44	01/26/44
G34A/R701-1192-GG	01/24/44 - 02/05/44	02/11/44
G34A/R702-1192-HH	02/07/44 - 02/19/44	02/24/44
G34A/R703-1192-II	02/21/44 - 03/04/44	03/08/44
G34A/R704-1192-JJ	03/06/44 - 03/18/44	03/24/44
G34A/R705-1192-KK	03/20/44 - 04/01/44	04/06/44
G34A/R706-1192-LL	04/03/44 - 04/15/44	04/20/44

G34A/R1377

1193

Monthly Report, period from
February 1 to February 28, 1945.
Columbia Univ. - Div. of War
Research
N.D. 20p.

This monthly report covers the
period Feb. 1 to 28, 1945, of
projects conducted at the Columbia
University, Division of War
Research, New London, CT.

HARVARD UNIVERSITY
UNDERWATER SOUND LABORATORY

ACCESSION NUMBERS

H1-1194A

THROUGH

1371

261/262
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H1

1194-A---1194-SSS

Biweekly Reports from June 29, 1942, to March 3, 1945.
Harvard Univ. - Underwater Sound Lab. 71 reports.

The following are biweekly reports of projects conducted at the Underwater Sound Laboratory of Harvard University from June 29, 1942, to March 3, 1945.

<u>Report No.</u>	<u>Period Covered</u>	<u>Report Date</u>
H1 - 1194-A	06/29/42 - 07/11/42	
H1 - 1194-B	07/11/42 - 07/25/42	
H1 - 1194-C	07/25/42 - 08/08/42	
H1 - 1194-D	08/08/42 - 08/22/42	
H1 - 1194-E	08/22/42 - 09/05/42	09/05/42
H1 - 1194-F	09/05/42 - 09/19/42	09/19/42
H1 - 1194-G	09/19/42 - 10/03/42	10/03/42
H1 - 1194-H	10/03/42 - 10/17/42	10/17/42
H1 - 1194-I	10/17/42 - 10/31/42	10/31/42
H1 - 1194-J	10/31/42 - 11/14/42	11/14/42
H1 - 1194-K	11/14/42 - 11/28/42	11/28/42
H1 - 1194-L	11/28/42 - 12/12/42	12/12/42
H1 - 1194-M	12/12/42 - 12/26/42	12/26/42
H1 - 1194-N	12/26/42 - 01/09/43	01/11/43
H1 - 1194-O	01/09/43 - 01/23/43	01/25/43
H1 - 1194-P	01/23/43 - 02/06/43	02/08/43
H1 - 1194-Q	02/06/43 - 02/20/43	02/23/43
H1 - 1194-R	02/20/43 - 03/06/43	03/06/43
H1 - 1194-S	03/06/43 - 03/20/43	03/20/43
H1 - 1194-T	03/20/43 - 04/03/43	04/05/43
H1 - 1194-U	04/03/43 - 04/17/43	04/19/43
H1 - 1194-V	04/17/43 - 05/01/43	05/03/43
H1 - 1194-W	05/01/43 - 05/15/43	05/18/43
H1 - 1194-X	05/16/43 - 05/29/43	05/31/43
H1 - 1194-Y	05/29/43 - 06/12/43	06/14/43
H1 - 1194-Z	06/12/43 - 06/26/43	06/28/43
H1 - 1194-AA	06/26/43 - 07/09/43	07/12/43
H1 - 1194-BB	07/10/43 - 07/23/43	07/26/43
H1 - 1194-CC	07/24/43 - 08/06/43	08/09/43
H1 - 1194-DD	08/07/43 - 08/20/43	08/23/43
H1 - 1194-EE	08/21/43 - 09/03/43	09/06/43
H1 - 1194-FF	09/04/43 - 09/17/43	09/21/43
H1 - 1194-GG	09/18/43 - 10/01/43	10/05/43
H1 - 1194-HH	10/02/43 - 10/15/43	10/19/43
H1 - 1194-II	10/16/43 - 10/29/43	09/03/43
H1 - 1194-JJ	10/30/43 - 11/12/43	11/16/43
H1 - 1194-KK	11/13/43 - 11/26/43	11/30/43
H1 - 1194-LL	11/27/43 - 12/10/43	12/13/43
H1 - 1194-MM	12/11/43 - 12/24/43	12/27/43
H1 - 1194-NN	12/25/43 - 01/07/44	01/10/44
H1 - 1194-OO	01/08/44 - 01/21/44	01/24/44
H1 - 1194-PP	01/22/44 - 02/04/44	02/07/44
H1 - 1194-QQ	02/05/44 - 02/18/44	02/21/44

<u>Report No.</u>	<u>Period Covered</u>	<u>Report Date</u>
H1 - 1194-RR	02/19/44 - 03/03/44	03/06/44
H1 - 1194-SS	03/05/44 - 03/18/44	03/20/44
H1 - 1194-TT	03/19/44 - 04/01/44	04/03/44
H1 - 1194-UU	04/02/44 - 04/15/44	04/17/44
H1 - 1194-WW	04/16/44 - 04/29/44	05/01/44
H1 - 1194-XX	04/30/44 - 05/13/44	05/15/44
H1 - 1194-YY	05/14/44 - 05/27/44	05/29/44
H1 - 1194-ZZ	05/28/44 - 06/10/44	06/12/44
H1 - 1194-AAA	06/11/44 - 06/24/44	06/26/44
H1 - 1194-BBB	06/25/44 - 07/08/44	07/10/44
H1 - 1194-CCC	07/09/44 - 07/22/44	07/24/44
H1 - 1194-DDD	07/23/44 - 08/05/44	08/07/44
H1 - 1194-EEE	08/06/44 - 08/19/44	08/21/44
H1 - 1194-FFF	08/20/44 - 09/02/44	09/04/44
H1 - 1194-GGG	09/03/44 - 09/16/44	09/18/44
H1 - 1194-HHH	09/17/44 - 09/30/44	10/02/44
H1 - 1194-III	10/01/44 - 10/14/44	10/16/44
H1 - 1194-JJJ	10/15/44 - 10/28/44	10/30/44
H1 - 1194-KKK	10/29/44 - 11/11/44	11/13/44
H1 - 1194-LLL	11/12/44 - 11/25/44	11/27/44
H1 - 1194-MMM	11/26/44 - 12/09/44	12/11/44
H1 - 1194-NNN	12/10/44 - 12/23/44	12/25/44
H1 - 1194-OOO	12/24/44 - 01/06/45	01/08/45
H1 - 1194-PPP	01/07/45 - 01/20/45	01/22/45
H1 - 1194-QQQ	01/21/45 - 02/03/45	02/05/45
H1 - 1194-RRR	02/04/45 - 02/17/45	02/19/45
H1 - 1194-SSS	02/18/45 - 03/03/45	03/05/45

H1 1195-A--1195-D
 Monthly Reports (formerly biweekly) from March 4 through June, 1945.
 Harvard Univ. - Underwater Sound
 Lab.
 4 reports.

The following are monthly reports of projects conducted at the Underwater Sound Laboratory of Harvard University from March 4 through June, 1945.

<u>Report No.</u>	<u>Period Covered</u>	<u>Report Date</u>
H1 - 1195-A	03/04/45 - 03/31/45	04/02/45
H1 - 1195-B	04/45	05/02/45
H1 - 1195-C	05/45	06/02/45
H1 - 1195-D	06/45	07/02/45

H3 1196
Harvard - NDRC Underwater Sound
Program.
Harvard Univ. - Underwater Sound
Lab.
N.D. 22 p.

This report describes three projects underway at Harvard. A brief synopsis is followed by a detailed outline of the specific aspects of each problem under consideration. Detailed reports concerning preliminary results are presented in the attached appendices.

H10 1197
STEDMAN, C. K.
Preliminary proposal for means of improving the performance of the QC echo-ranging equipment.
Harvard Univ. - Underwater Sound Lab.
Sep. 27, 1941 6p.

This report contains a brief outline of a proposal for improving the accuracy and ease of operation of QC echo-ranging equipment of ships where it has been installed in duplicate. The system makes use of the sharp directionality obtainable by the proper use of overlapping beams from two projectors, and is designed for visual indication on a cathode-ray oscilloscope screen. The principal advantage claimed for the system is that it does not depend for direction finding on comparing the intensities of successive echos as the projector is trained back and forth across the target. Instead, within a range of ± 10 deg each echo indicates in which direction and approximately how much the projector must be turned to get the correct bearing. Other advantages include comparative insensitivity to variations in signal strength and the possibility of visual as well as aural discrimination to

help in distinguishing true echos from noise and reverberation. The device is such that, if it is found to be a worthwhile adjunct to the QC equipment, it can easily be added thereto with very minor changes in wiring. It can also be switched in or out at the discretion of the operator and will not interfere with the present technique of operation.

H15 1198
BELL, M. E.; SCHUCK, O. H.; and
STEDMAN, C. K.
Report on visit to the Key West Sound School, October 17 and 18, 1941.
Harvard Univ. - Underwater Sound Lab.
Nov. 8, 1941 7p.

A visit was made to the Key West Sound School to observe both the operation of the QC echo-ranging equipment and the method of conducting attacks. Each of these areas are covered in detail.

H25 1199
STEDMAN, C. K.
Progress report on proposals for use of overlapping lobes.
Harvard Univ. - Underwater Sound Lab.
Sep. 15, 1941 16p.

An overlapping-lobe method of direction finding is one which makes use of the properties of two directional patterns which originate at nearby points. These are aimed so as to partially overlap and are distinguishable by a difference in frequency or some other characteristic. These may be the directional patterns of transmitters, receivers, or both. It will appear in the following discussion that such arrays offer scope for many applications that are impossible with a single beam

and, in particular, can have a sharp directionality, even though the overlapping beams are both very broad. Also a single beam only gives indications of direction if it is moved electrically or mechanically, whereas, with overlapping lobes, angles can be measured directly within a range of 50 or 60 deg. without motion of the patterns. In this report, particular attention is given to one proposal for using overlapping lobes to measure depth angle by a method that utilizes the ratio R_1/R_2 of the signal amplitudes received from the two beams.

H30 1200

Preliminary report on an echo-ranging method simultaneous-lobe comparison for azimuth (SLCA) determination.
Harvard Univ. - Underwater Sound Lab.
Dec. 13, 1941 5p.

A novel principle of simultaneous-lobe comparison is described, and its application to QC equipment is discussed. It should increase considerably the speed with which bearing information can be obtained, as well as improving the accuracy of the bearings. The general theory is given, experimental results are quoted, and present plans for further development are described. Other possible applications of this principle are mentioned.

H35 1201

Project C4-OEMsr-58 progress report.
Harvard Univ. - Underwater Sound Lab.
Nov. 13, 1941 2p.

The objectives and efforts of the Harvard-NDRC group may be divided into four categories: (1) improvements in present QC

equipment, (2) development of scanning systems for continuous presentation of three position coordinates of the target, (3) study of reflecting efficiency of sea bottom and target-hull construction, and (4) survey of the sound fields both near, and at a considerable distance from, ships and submarines. The present status of each of these projects is described.

H37 1202

Absolute calibration of transmitters and hydrophones AR-FVH.
Harvard Univ. - Underwater Sound Lab.
Jan. 1942 v.p.

The system described is for the purpose of calibrating any sound source underwater. It can also be used to obtain order of magnitude in the calibration of hydrophones. Each part of the system is discussed in detail with all calibration graphs.

H41 H56 1203

Harvard-NDRC project
C2-OEMsr-58 progress report, 8
January to 28 February, 1942.
Harvard Univ. - Underwater Sound Lab.
Jan. 8, 1942 6p.

The objectives and efforts of the Harvard-NDRC group (contract OEMsr-58) may be divided into four categories: (1) improvements in present echo-ranging equipment, (2) development of sonic-locator systems for continuous presentation of the position coordinates of all targets, (3) study of reflecting efficiency of sea bottom and target-hull construction, and (4) survey of sound field both near, and at a considerable distance from ships and submarines. The present status of each project is described in the report.

H45 1204
HUNT, F. V.
Appraisal of sonic-locator
apparatus.
Harvard Univ. - Underwater Sound
Lab.
Jan. 18, 1942 2p.

This memorandum summarizes an
analysis of sonic-locator
apparatus. The system that must
meet the objective of continuous
indication of the location of all
targets within range is the crossed
dipole CRAB. This system is
described, along with other systems
which were not chosen.

H50 1205
Progress report on sonic-
locator developments.
Harvard Univ. - Underwater Sound
Lab.
Dec. 29, 1941 81p.

This report contains a
discussion of a number of proposed
echo-ranging systems that scan the
entire horizon automatically. One
of these systems employs a rotating
projector, another is a receiver
whose directivity is switched
mechanically by means of a
commutator, and a third is a
receiver whose directivity is
rotated by purely electrical
means. The mathematical theory of
such electrically-rotated beam
patterns is worked out in a very
general form so as to show their
practical possibilities and
limitations. Theory and
experimental results are presented
on a new way of producing the
effect of overlapping lobes
simultaneously in two receiver
channels by proper electrical
connections to the two halves of a
single split receiver. The most
important application of this
principle at present seems to be to
improve the speed and accuracy of
bearing determination with QC
equipment. The response of a
receiver in the standing-wave
pattern set up by reflection of

sound from the surface of the water
has been analyzed in a very general
way. The results have been
expressed to show how surface
reflections will influence the
performance of two spot- or lobe-
comparison systems for depth angle,
QC, or any other underwater-
receiving system.

H54 1206
MILLER, L. N.
The resonance frequency of
Y-cut Rochelle salt crystals as a
function of the crystal dimensions.
Harvard Univ. - Underwater Sound
Lab.
Feb. 1, 1942 8p.

From a recent study of the
behavior of Rochelle salt crystals
at and near the point of resonance,
there arose the problem of crystal
resonance frequencies as a function
of the dimensions of the crystal.
The method, in general, has
followed three steps: first, to
determine the "primary resonant
frequency" of a "thin crystal";
second, to study the influence of
the crystal size on that primary
resonant frequency; and third, to
correlate, in some manner, the
other strong resonant frequencies
with the primary resonance. Merely
for means of differentiation, the
lowest resonant frequency, which
is also the strongest, is referred
to as the "primary resonance." The
next strong resonance, at a
somewhat higher frequency, shall be
called the "secondary resonance."
The measurement of the resonance
point was carried out on a radio-
frequency capacitance and
resistance bridge.

H60 1207
Progress report on SLCA
development.
Harvard Univ. - Underwater Sound
Lab.
Mar. 5, 1942 21p.

The simultaneous-lobe comparison for azimuth (SLCA) principle was first experimentally proven in the early part of December, working from USS GALAXY. A series of tests were made on the SLCA system. The general results are that the SLCA system is sensitive to a change of 1-to 2-deg in azimuth; that two indicating systems employing cathode-ray tubes and one indicating system employing a meter have been successfully employed, while a third cathode-ray tube indicator has shown considerable promise.

H64 1208
Advance notice of report on directivity patterns.
Harvard Univ. - Underwater Sound Lab.
Apr. 1942 5p.

This is the outline of a report on directivity patterns now being prepared.

H65 1209
Directivity patterns of sound sources.
Harvard Univ. - Underwater Sound Lab.
Apr. 29, 1942 89p.

In this report, pressure patterns alone are considered. Results are expressed graphically, using sound level expressed in decibels (dB). It is assumed that the distance between the source of sound and the point of reception is large compared with the dimensions of the source. Another primary concern was with the distribution of pressure amplitude in angle. It is, therefore, convenient to disregard factors depending on distance and to normalize the angular distribution to unity in some direction. An acoustical reciprocity theorem applies to all

the calculations set forth in this report; that is, the directional pattern in transmission is the same as the directional pattern in reception, provided the term, "directional pattern," is understood in the proper sense.

H70 1210
Interim report on echo-ranging experiment on the USS GALAXY (IX-54).
Harvard Univ. - Underwater Sound Lab.
Mar. 22, 1942 4p.

This report details conclusions made from echo-ranging equipment on USS GALAXY. The experiments were made using standard QC equipment.

H72 1211
BROWN, R. L. and PELLAM, J. R.
Condensed report on underwater-impedance measurements.
Harvard Univ. - Underwater Sound Lab.
May 8, 1942 5p.

This report details investigations of the sound-reflecting properties of various substances and objects, insofar as those properties can be determined by standard impedance procedures. The results are given only for the impedance of sand and gravel in the laboratory setup and for the impedance of sea bottom in Boston Harbor.

H73 1212
BROWN, R. L. and PELLAM, J. R.
Underwater-impedance measurements.
Harvard Univ. - Underwater Sound Lab.
May 8, 1942 v.p.

The underwater-impedance measurement program was organized for the purpose of investigating the sound-reflecting properties of various substances and objects, insofar as those properties can be determined by standard impedance procedures. An indoor impedance tube was setup for laboratory measurements on small samples and accompanying laboratory techniques were developed. Necessary equipment and procedures were devised for measurements of under-surface conditions at sea, and these tools were successfully used in free-field measurements on sea bottom. Tube measurements showed (1) the velocity of sound in water within the tube was less than in free water, (2) sand in the water further diminished the velocity where coarse gravel produced no change, and (3) fine sand apparently acted as an excellent absorber at 800 cps.

H75 1213
Transducer development.
Harvard Univ. - Underwater Sound Lab.
June 1942 41p.

This report is the result of work done by Division C, Section 4, on investigating devices for generating and receiving sound underwater. The report is primarily concerned with reversible transducers. The purpose is to collect what has been done and what needs to be done. The group has developed techniques for building both piezoelectric and magnetostrictive transducers and this is described. Measurements have been made on all the devices built to determine how well their actual behavior agreed with theory and satisfied the requirements.

H80 1214
SLC instructions, Model XI.
Harvard Univ. - Underwater Sound Lab.
June 1, 1942 18p.

Directions for normal operation of the unit are given in this manual. Instructions for operating adjustments and installation are also included. The normal operating voltage and gain readings are presented in tabular form. The connections of the unit are shown in diagrams.

H81 1215
SCHUCK, O. H.
SLC instructions, Model XI.
Harvard Univ. - Underwater Sound Lab.
June 8, 1942 17p.

This report contains instructions for operating SLC equipment. Installation procedures are also given. Diagrams are included showing the various connections of the apparatus.

H82 1216
SLC equipment, Model XI.
Harvard Univ. - Underwater Sound Lab.
June 19, 1942 30p.

The SLC equipment is used in conjunction with the standard echo-ranging equipment to provide the sound operator with additional information regarding the bearing of the target. The equipment is described in this report and the principle of operation is explained. Instructions for operating and installing are also included. Drawings provide detail of the equipment.

H85 1217
SLC equipment, Model X2.
Harvard Univ. - Underwater Sound
Lab.
June 30, 1942 28p.

This report contains the purpose and principle of operation of SLC equipment. Directions for operating, installing, and servicing are included.

H87 1218
HATHAWAY, J. L.
Time variation of gain for standard QC receivers.
Harvard Univ. - Underwater Sound
Lab.
July 26, 1942 3p.

This report contains a complete list of necessary parts, a schematic diagram, an approximate wiring diagram, and instruction and operation comments. TVG is accomplished by the conventional method of reducing the transconductance at the time of a transmitted ping by means of suddenly increasing the grid bias. This excess of bias is allowed to leak off gradually through a time-delay circuit, permitting gain to build up toward normal. This time-varied bias can be applied to one or more tubes. Obviously, with a given grid bias, greater change variation is achieved by application to more than one tube.

H90 1219
NOLLE, A. W.
The audible-Doppler enhancer.
Harvard Univ. - Underwater Sound
Lab.
Aug. 28, 1942 6p.

This memorandum discusses the general problems involved in constructing Doppler enhancers and describes a typical circuit. Doppler enhancers, which are

devices for increasing the magnitude of the audible Doppler effect, have appeared promising in preliminary trials with standard QC echo-ranging equipment.

H96 1220
Status report to September 1, 1942.
Harvard Univ. - Underwater Sound
Lab.
N.D. 17p.

The simultaneous-lobe comparison (SLC) system presents to the sound operator on the destroyer, PC boat, or other searching vessel, a visual picture that indicates whether the submarine target is to the right or left of the axis of the sound projector. This information gives positive instruction to the operator regarding the required direction of rotation of the projector in order that it may be properly and continually trained on the submarine. This development is covered in some detail and time-varied gain is also covered in this progress report. Time-varied gain (TVG) is a very simple modification of existing echo-ranging receivers that lowers the gain of the amplifier throughout a short interval following the emission of the pulse of sound, to relieve the ears of the sound operator and ship's personnel from the terrific burst of sound customarily emitted from the loudspeaker during this time interval. Also covered are developments in the Doppler enhancer, visual Doppler indicator, own-Doppler nullifier, automatic training, QC monitor, acoustic marine speedometer, range-and-bearing recorder, and gyro-stabilization of SLC indications, along with other projects.

H97 1221
Summary of projects at the Underwater Laboratory at Harvard University.
Harvard Univ. - Underwater Sound Lab.
Oct. 1942 12p.

This report is a summary of projects currently in progress at the Laboratory. Projects currently being worked on include: simultaneous-lobe comparison, Doppler enhancers, time-varied gain, visual Doppler indicator and own-Doppler nullifier, automatic training, QC monitor, acoustic marine speedometer, range and bearing recorder, and sonar systems.

H101 1222
CUMMEROW, R. L. and BUNDY, F. P.
Note on back and side radiation of WEA-1 (RCA 9-in.) projector.
Harvard Univ. - Underwater Sound Lab.
Nov. 21, 1942 5p.

The effects of a baffle and pressure-release surfaces on the back and side radiation of the WEA-1 head were measured on three different occasions. The general procedure for these measurements is described.

H102 1223
HUNT, F. V.
Outline of the factors involved in the successful use of echo-ranging.
Harvard Univ. - Underwater Sound Lab.
Dec. 8, 1942 3p.

This memorandum is a functional outline of the factors involved in the successful use of echo-ranging. The outline shows the desirable features, whose improvement should represent the objective of new equipment design, illustrating the manner in which

the program is directed toward these ends. Tabulated opposite each of these desirable features is the project or development that is intended to improve that feature.

H103 1224
HATHAWAY, J. L. and SCHUCK, O. H.
SLC development.
Harvard Univ. - Underwater Sound Lab.
Jan. 1, 1943 74p.

The work on SLC equipment described in this report is part of a program aimed at improvement of echo-ranging equipment and methods that has been, and is being, carried out under contracts OEMsr-58 and OEMsr-287 with Harvard University for the National Defense Research Committee. This report describes the equipment in detail, covers the theory on which its operation is based, and covers the theory of its development.

H105 1225
HATHAWAY, J. L.
Notes on a proposed method of range and bearing indication for use on submarines.
Harvard Univ. - Underwater Sound Lab.
Jan. 9, 1943 4p.

This memorandum describes a system whereby range and bearing can be determined by acoustical means without transmitting a ping or pulse; that is, the received acoustical energy is derived from the noise of the target, itself, rather than from an echo off the target. The principle involved is that of triangulation, whereby, if exact bearings of sound received at two points are known, the distance to the point of origin of the sound can be determined geometrically.

H106 1226
Tentative instruction book SLC
unit, Model X-3.
Harvard Univ. - Underwater Sound
Lab.
Jan. 7, 1943 v.p.

The SLC equipment is used in connection with the standard echo-ranging apparatus to provide the sound operator more rapidly with information of greater accuracy regarding the bearing of a target. This report gives operating and installation notes on the SLC unit, Model X-3.

H106A 1227
Operating and installation
notes for BDI (SLC) unit, Model X-3.
Harvard Univ. - Underwater Sound
Lab.
N.D. v.p.

The principle of operation and operating instructions for the BDI (SLC) unit, Model X-3, are included in this manual. Installation procedures are also part of this manual.

H108 1228
HATHAWAY, J. L. and SCHUCK, O. H.
SLC development.
Harvard Univ. - Underwater Sound
Lab.
Jan. 1, 1943 74p.

A system of simultaneous-lobe comparison (SLC) has been developed that is capable of allowing greatly enhanced accuracy and speed of bearing determination in underwater-listening and echo-ranging. It has been applied specifically to an auxiliary device for use with standard echo-ranging equipments. The purpose, principle of operation, and operation of this device are given in Chapter I by excerpts from the instruction

manual issued for it. In Chapter II is given a description of the construction of the SLC unit, the electrical circuits used in it and their operation, and details of its application to the various standard forms of echo-ranging equipment. Chapter III describes further improvements in echo-ranging equipment and technique which are made possible by taking advantage of SLC capabilities. Chapter IV gives a comprehensive treatment of the theory of the SLC principle and its practical application. Chapter V traces the history of the SLC development.

H107 1229
SABINE, P. E.; HARDY, H.; MILLER, L. N.; and BUNDY, F. P.
Present status of transducer development.
Harvard Univ. - Underwater Sound
Lab.
Jan. 12, 1943 13p.

The present status of transducer development is reported by the people involved in the development. Transducers being worked on include modified Thuras type, cone type, slotted plate and tube, and asymmetrical stack. Other types of transducers are also described.

H108 1230
SCHUCK, O. H. and RODMAN, I. P.
QC monitor.
Harvard Univ. - Underwater Sound
Lab.
Jan. 12, 1943 7p.

The QC monitor is a device designed to perform tuning and measurement operations on echo-ranging equipment. The uses of the monitor are described in detail. Photographs and plans of the equipment are included.

H110 1231
KNAUSS, H. P.

Report on the rotoscope and the status of MR and ER SONAR research. Harvard Univ. - Underwater Sound Lab.
Jan. 18, 1943 8p.

The procedure now used in echo-ranging is analyzed. MR and ER SONAR systems are described that search around the horizon on each ping, yield range and bearing data on each ping, and require much less operator training than the present system. The rotoscope, an experimental MR SONAR device now being tested in the field, is described and preliminary results are reported.

H112 1232
RODMAN, I. P.

Memorandum on own Doppler nullifier, ODN, Mk II. Harvard Univ. - Underwater Sound Lab.
Jan. 19, 1943 2p.

ODN, Mk II, is primarily intended as a conversion unit to be applied to the #755 echo-ranging receiver, but with slight modification it can be applied to any receiver having a heterodyne stage. Its function is to correct the audio-frequency output of the receiver for the frequency shift that occurs due to the searching ship's own motion. It does this automatically, thereby eliminating the necessity for frequent adjustments by the operator.

H114 1233
SEBRING, P. B.

Memorandum on Doppler indicator, DI, Mk I (experimental model). Harvard Univ. - Underwater Sound Lab.
Jan. 1, 1943 5p.

The Doppler indicator will be capable of telling the operator whether his Doppler is "up" or "down" (closing or opening) and "fast" or "slow" with much greater reliability than his own sense of pitch has been able to do in the past. This report describes a model that has only been used with QC equipment having a range gate, installed on the Sangamo chemical recorder. The instrument gets its signal from the plate of the last audio stage in the QC receiver.

H115 1234
SCHUCK, O. H.
RCA split.
Harvard Univ. - Underwater Sound Lab.
Feb. 12, 1943 4p.

This memorandum describes the RCA projectors as physically similar to the Submarine Signal Company's QC projector but considerably different in internal wiring. Drawings are included showing the current distributions.

H117 1235
BONER, C. P.; HATHAWAY, J. L.; and RUTHERFORD, C. R.

Tests of echo-ranging equipment on USS NIELDS. Harvard Univ. - Underwater Sound Lab.
Mar. 1, 1943 8p.

Tests of echo-ranging equipment were made and the conclusion was that normal QC-type operation of this equipment was very unsatisfactory and, further, that SLC operation would be equally unsatisfactory. Directional-pattern measurements on the projector-dome assembly of USS NIELDS were made with the aid of the QC monitor and the results are shown in the included graphs.

H118 1236
BONER, C. P.; SMITH, F. H.; SCHUCK,
O. H.; and MORRICAL, K. C.

WEA-1 installation on the USS
BARNEGAT.

Harvard Univ. - Underwater Sound
Lab.

Mar. 2, 1943 1p.

The results of installation of
WEA-1 equipment on USS BARNEGAT are
detailed. The ship's radio officer
was very critical of the equipment.

H118.5 1237

Failure of WEA-1 shaft on board
the AP-10. USS BARNEGAT.

Harvard Univ. - Underwater Sound
Lab.

Mar. 12, 1943 7p.

This report consists of
photographs of the WEA-1 shaft
which snapped off of the equipment
installed on USS BARNEGAT. The
failure was due to the fatigue on
the metal, which was brought on by
the fluttering of the fish under
moderate speed.

H120 1238
BONER, C. P.; SCHUCK, O. H.; and
NOLLE, A. W.

Tests of echo-ranging equipment
on USS ORDRONAU.

Harvard Univ. - Underwater Sound
Lab.

Mar. 6, 1943 9p.

This memorandum describes a
test installation of an own-Doppler
nullifier and time-varied gain
device on USS ORDRONAU. This
combination unit was installed as
an auxiliary to the starboard QC
equipment furnished by Submarine
Signal Company.

H121 1239
CHERNOSKY, A. A.; LANE, H. M.; and
SCHUCK, O. H.

Preliminary survey of ships of
Fleet Sound School, Key West, FL,
to determine possibility of
installing SLC units and installed
monitors.

Harvard Univ. - Underwater Sound
Lab.

Mar. 5, 1943 3p.

This memorandum details a
preliminary survey made to
determine the possibility of
installing SLC units and installed
monitors on board the school
ships. Each ship was visited and
the type and location of the
receiving stack was noted. The
practicability of installing the
SLC unit in a convenient location
adjacent to the receiving stack was
considered and tentative
conclusions were set down. In
addition, the driver stack and
hoist were examined and possible
locations for the hoist and
amplifier case of the installed
monitor were considered.

H123 1240
SMITH, F. H.

Report on conference at the
Sangamo Electric Company in
Springfield, IL, on March 19, 1943,
to determine specifications for the
automatic training device to be
added to the console chemical
recorder.

Harvard Univ. - Underwater Sound
Lab.

Mar. 22, 1943 4p.

The specifications that were
agreed to at the conference are
given in this memorandum.

H124 1241
NOLLE, A. W. and FELSING, W. A.

Electronic own-Doppler
nullifier.

Harvard Univ. - Underwater Sound
Lab.

Mar. 24, 1943 13p.

The electronic own-Doppler nullifier is an auxiliary to standard echo-ranging equipment and is intended to nullify the Doppler shift of frequency in the received underwater sound produced by the motion of the searching ship through the water. Any Doppler shift of frequency observed can, hence, be attributed solely to the motion of the underwater target.

H126 1243
BROOKS, H.; HATHAWAY, J. L.; and
SCHUCK, O. H.

SLC system proposed by L.
Barton, of RCA.
Harvard Univ. - Underwater Sound
Lab.
Apr. 25, 1943 9p.

The general idea of the SLC system proposed by L. Barton is to use a split head, add the voltages from the two halves and amplify in one channel, subtract the voltages from the two halves and amplify in another channel, shift the phase of one channel by 90 deg, and combine the outputs of the two channels in a phase-sensitive rectifier to give a dc voltage having SLC sense for operating the right-left indicator. This system has the possibility of some economy in equipment and, therefore, deserves careful consideration. This memorandum describes the study done on this equipment.

H128 1244
HATHAWAY, J. L.; RUTHERFORD, C. R.;
and FELSING, W. A.

QBE receiver modifications.
Harvard Univ. - Underwater Sound
Lab.
Apr. 26, 1943 10p.

The purpose of the modifications described in this report was the application of time variation of gain to certain QBE receivers installed on Navy ships.

The defects of the QBE receiver are described and, then, the modifications are discussed.

H131 1245
SMITH, F. H.

Report on conference at the
Harvard Underwater Sound Laboratory
in Cambridge, MA., on Thursday,
April 29, 1943 to discuss plotting
devices in connection with
underwater sound.
Harvard Univ. - Underwater Sound
Lab.
May 3, 1943 3p.

The purpose of the meeting was to discuss the three plotters that have been developed by the organizations represented at this conference. Discussions were held concerning the DRT and the odograph. Specifications were drawn up for the odograph.

H132 1246
KNAUSS, H. P.

Report on commutated-rotation
sonar.
Harvard Univ. - Underwater Sound
Lab.
May 5, 1943 18p.

The procedure used in present searchlight-type echo ranging is analyzed. Searching around the horizon at a 2000-yd range requires about 3 min. Using the cut-on method, center bearings are obtained at intervals of not less than 20 s, and range indications are lacking on out of 3 pings. Scanning procedures are described that search around the horizon on each ping, yielding range and bearing data on each ping. The demands on the sound operator are greatly reduced, hence, much less skill and training are required. A scanning device is described that employs a 36-element transducer and a beam-switching device consisting of a rotating capacitive

commutator. The transducer is at present approaching completion, and the commutator and associated electronic equipment have performed successfully in bench tests.

H133

1247

Preliminary operating instructions automatic target training as installed on QBF equipment on USS SEMMES. Harvard Univ. - Underwater Sound Lab. May, 10, 1943 4p.

The operation of automatic target training is described in this memorandum. Automatic target training is accomplished by utilizing the right-left signals of a bearing-deviation indicator to control a small motor that operates the hand-training control in the proper direction to reduce the bearing deviation.

H134

1248

SCHUCK, O. H.

SLC splitting methods, series and parallel methods of connecting echo-ranging gear for SLC operation. Harvard Univ. - Underwater Sound Lab. May 13, 1943 6p.

The two methods for driving a projector split into right and left halves for SLC operation are described. One method is to drive the two halves in parallel, while the other is to drive them in series. Either method can also be used for connecting the halves to a receiving amplifier or to an SLC unit. The conclusion, based on the experimental work done, indicates that either series or parallel connection of the projector will give satisfactory SLC operation.

H136

1249

Description of devices to be demonstrated on USS SEMMES and USS GALAXY. Harvard Univ. - Underwater Sound Lab. May 22, 1943 v.p.

This memorandum describes devices that are to be demonstrated during a visual-inspection tour. The devices include automatic target training, own-Doppler nullifier, reverberation-controlled gain, and reverberation-suppression filter. The inter dependence of the above with other associated apparatus is detailed.

H140

1250

Sound-gear monitor tentative instruction book. Harvard Univ. - Underwater Sound Lab. June 1, 1943 9p.

The portable sound-gear monitor is a piece of test apparatus designed to permit checking, separately, the transmitting and receiving performance of standard Navy echo-ranging equipment, together with any pieces of auxiliary equipment that may be used therewith. The general fields of usefulness of the sound-gear monitor are checking directivity patterns of sound gear, either in transmitting or in receiving, in tuning sound gear in transmitting and receiving, and in making rough measurements of transmitting power and of receiving sensitivity. The operating instructions for this equipment are tentatively outlined.

H141

1251

SCHUCK, O. H. and FELSING, W. A.

The direct measurement of impedance. Harvard Univ. - Underwater Sound Lab. June 4, 1943 7p.

A method has been devised that will measure the impedance of an underwater-sound transducer in terms of magnitude and phase angle. The method is described and drawings are included.

H142 1252
KNAUSS, H. P.; SCOTT, R. M.; and THOMPSON, W. S.

Scanning-sonar system; proposed specifications for operating characteristics.
Harvard Univ. - Underwater Sound Lab.
June 4, 1943 6p.

Scanning sonar is a sonar system in which the area within the underwater horizon is continuously scanned, and in which the position of all reflecting objects within this area is indicated. The advantages of the scanning sonar system are (1) sensitivity in all directions simultaneously, for more effective searching, greatly reducing the risk of missing a possible contact entirely; (2) simplicity of operation, for better results with less operator training, and (3) increased rate and regularity of range and bearing indications, for greater success in attack. The recommended presentations are (1) PPI and/or PPI_{mod} for the sound operators, and (2) PPI and/or PPI_{mod}, with geographical plotting, for target and ship, for conning officers. Proposed specifications are described.

H142.5 1253
HEBB, M. H. and BROOKS, H.
Magnetrostrictive transducers.
Harvard Univ. - Underwater Sound Lab.
June 22, 1943 103p.

The transducers considered in this report are restricted to linear devices that satisfy a

reciprocity theorem connecting their efficiency in transmission and their sensitivity in reception. The equations for this theorem are included, as are equations for magnetrostrictive theory.

H143A 1254
BDI test procedure.
Harvard Univ. - Underwater Sound Lab.
July 16, 1943 11p.

The test procedure for the BDI is outlined in this report. The filter-alignment procedure and oscillator-tracking procedure are included. The BDI relay-adjustment procedure is described and diagrams of it are included.

H145 1255
SCHUCK, O. H.
Inductive echo simulator.
Harvard Univ. - Underwater Sound Lab.
June 28, 1943 16p.

This report presents the theory underlying the operation of an inductive echo simulator and its application as a practice aid. A novel arrangement of coils has been made to meet the requirements of an echo simulator.

H147 1256
BUTZ, A. N.; HEBB, M. H.; BROOKS, H.; and FELSING, W. A.
BDI (SLC) development Model X-4.
Harvard Univ. - Underwater Sound Lab.
June 17, 1943 v.p.

To simplify commercial construction and shipboard installation of the bearing deviation indicator, certain modifications have been

introduced into the design of Model X-5. These modifications have resulted in a new model, known as Model X-4. This model utilizes a common amplifier for most of the amplification of the signals delivered from the two sides of the BDI lag line. Directionality information is carried through this amplifier by means of local modulation impressed on the carrier frequency. After amplifications, a detector that is sensitive to the phase of the modulation is used to produce right-left deflections on the oscilloscope. Field tests indicate that the performance of this unit is essentially identical with that of Model X-5. The principles of operation are described and graphs of the outputs are included.

H150 1257
 DRISKE, B. B.
 Some electromechanical analogs.
 Harvard Univ. - Underwater Sound Lab.
 July 1, 1943 3p.

Some electromechanical analogs for the impedance-reactance function and for system 9 are given. A chart that shows the various symbols is included.

H163 1258
 Water background-noise measurements, Fort Lauderdale, FL.
 Harvard Univ. - Underwater Sound Lab.
 Aug. 5, 1943 5p.

This memorandum describes investigations of water background noise made near Fort Lauderdale, FL. Two series of experiments were performed, one on June 14, and the other on June 16, 1943.

H165 1259
 Instruction book for echo-ranging conversion unit.
 Harvard Univ. - Underwater Sound Lab.
 Aug. 10, 1943 30p.

The echo-ranging conversion unit described in this instruction book consists of three separate pieces of equipment. Two of these, the echo-ranging booster (ERB) and the Audible Doppler enhancer (ADE), are intended to improve the performance of the standard echo-ranging sound receiver. The third, automatic target training (ATT) serves to point the sound projector automatically in the direction of the target once contact has been made. The complete equipment, in the form described, is intended for installation on the QC type echo-ranging gear manufactured by the Submarine Signal Company. It is assumed that the QC gear is equipped with a Model X-3 bearing-deviation indicator (BDI).

H170 1260
 Transducers for sonar.
 Harvard Univ. - Underwater Sound Lab.
 Sept. 13, 1943 4p.

This report contains photographs of transducers for sonar taken in September 1943.

H175 1261
 Installation and maintenance manual for BDI unit.
 Harvard Univ. - Underwater Sound Lab.
 Oct. 1, 1943 v.p.

The bearing deviation indicator (BDI) is used in conjunction with the regular echo-ranging equipment. It indicates to the sound operator, on each echo, whether the projector is pointed to

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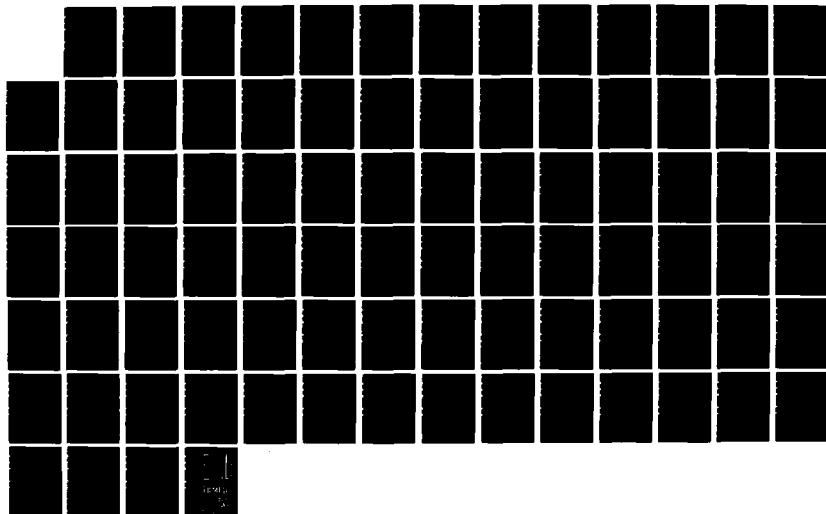
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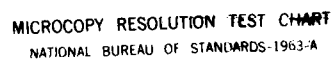
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

the right of the target, to the left of the target, or directly toward it. This instruction book contains a photo and numerous drawings.

H176 1262
Operator's manual for BDI unit.
Harvard Univ. - Underwater Sound Lab.
Oct. 1, 1943 v.p.

This manual contains a brief statement of purpose of the bearing-deviation indicator, instructions for making preliminary checks, complete operating instructions, and a check list of adjustments. Photos are included.

H177 1263
Operator's manual for underwater-sound portable testing equipment (sound-gear monitor).
Harvard Univ. - Underwater Sound Lab.
Oct. 1, 1943 50p.

The portable sound-gear monitor (underwater sound portable testing equipment, Model OAX) is designed for use in checking standard Navy echo-ranging gear to maintain it at its highest operating efficiency. This operating manual contains graphs, photos, and a drawing.

H177.1 1264
Supplementary instructions for SGM Model 5C equipment, serial No. 46, as modified to cover high-frequency systems.
Harvard Univ. - Underwater Sound Lab.
Apr. 1, 1944 3p.

The range of this monitor has been extended from 17 to 71 kc and, on transmitting, the 10 dB pad has been changed to 6 dB. These instructions also include maintenance notes.

H178 1265
Maintenance manual for underwater-sound portable testing equipment (sound-gear monitor) Harvard Models 5C, 5D, and 5E.
Harvard Univ. - Underwater Sound Lab.
June 20, 1944 62p.

The complete sound-gear monitor consists of a special magnetostrictive hydrophone and a combination amplifier-oscillator unit. The three models of the device considered in this maintenance manual are the Harvard Models 5C, 5D and 5E. The expanded-frequency monitor, which was still in the development stage when this manual was issued, is not included. Drawings and photos are included.

H187 1266
Projector test gear for field testing of echo-ranging projectors.
Harvard Univ. - Underwater Sound Lab.
Oct. 15, 1943 v.p.

This report concerns the design and use of a relatively simple handling gear for testing the efficiency and directivity of underwater-sound projectors before their installation on board ship. The auxiliary equipment employed in the test procedure consists of two sound-gear monitors (underwater-sound portable testing equipment, Model OAX). The general method of making the tests and the necessary testing equipment are described in the main body of the report. An appendix contains specific suggestions for the design of the required gear, detailed directions for conducting the tests, and a discussion of the results to be obtained.

H191 1267
Transducers SGM portable.
Harvard Univ. - Underwater Sound
Lab.
N.D. 4p.

This report consists of four
photos.

H200 1268
Use of bathythermograph
observations in predicting sound
ranges.
Harvard Univ. - Underwater Sound
Lab.
Nov. 20, 1943 12p.

This report is a partial
reprint of the BuShips manual,
"Prediction of Sound Range from
Bathythermograph Observations, Part
II," together with some added
material. It presents a brief
discussion of the effect of water
temperature on maximum sound ranges
and the use of the bathythermograph
in measuring ocean temperatures.
Included also are certain pertinent
facts concerning water conditions
in Boston Harbor and vicinity.

H205 1269
Electronic automatic search.
Harvard Univ. - Underwater Sound
Lab.
Dec. 1, 1943 10p.

This report describes a system
of electronic automatic search.
(EAS). The work was undertaken
primarily to provide a means of
automatic search for the Harvard
echo-ranging console, but the
result has been a compact unit that
can be used as an auxiliary with
any selsyn-trained system.

Photographs and a circuit
diagram are contained in the report
and the operation of the unit is
described in detail. A list of all
parts used in EAS is included as an
appendix to this report.

H210 1270
GODBOLD, N. H.
Resistance of various finishes
to salt-spray corrosion.
Harvard Univ. - Underwater Sound
Lab.
Dec. 7, 1943 6p.

The tests reported here were
conducted recently to test the
relative resistance to salt-water
corrosion of some 20 types of
finishes commonly used in this
Laboratory. Stainless steel,
anodized aluminum, and
cadmium-plated steel, in order, are
most satisfactory for the
construction of devices exposed to
salt spray where the surface has to
be conducting or where connections
are to be made by biting action of
lockwashers. If a painted surface
is desired, anodized aluminum with
gray enamel or optical-black finish
is indicated.

H212 1271
Performance requirements of
echo-ranging booster as applied to
Submarine Signal Company
echo-ranging gear.
Harvard Univ. - Underwater Sound
Lab.
Dec. 10, 1943 7p.

This report includes the
paramount requirements, the
necessary modifications in existing
equipment, and the performance
requirements for the echo-ranging
booster (ERB).

H212b 1272
Performance requirements of
echo-ranging booster as applied to
Submarine Signal echo-ranging gear.
Harvard Univ. - Underwater Sound
Lab.
Dec. 30, 1943 7p.

This report discusses the
paramount requirements, the
necessary modifications in existing
equipment, and the performance
requirements of the echo-ranging
booster (ERB).

H215 1273
WATSON, R. B.
Specifications for recorders.
Harvard Univ. - Underwater Sound
Lab.
Dec. 17, 1943 v.p.

These specifications for
recorders include photographs and
drawings.

H215a 1274
WATSON, R. B.
Specifications for recorders.
Harvard Univ. - Underwater Sound
Lab.
Mar. 1, 1944 10p.

These specifications cover the
paper-strip type and portable polar
chart recorders.

H219 1275
BDI training aid for use with
Sangamo attack teacher.
Harvard Univ. - Underwater Sound
Lab.
Dec. 22, 1943 7p.

This paper describes the BDI
training aid, which is to be used
with the Sangamo attack teacher.
This device was designed to give,
at all times, visual BDI
indications synchronized with the
audible signals generated by the

attack teacher and to provide a
realistic BDI indication of both
reverberation and echo.

H220 1276
WATSON, R. B.
Wiring diagrams of modified
Sound Apparatus Co. recorder.
Harvard Univ. - Underwater Sound
Lab.
Dec. 23, 1943 4p.

This report consists of four
pages of wiring diagrams for the
modified Sound Apparatus Co.
recorder.

H223 1277
KIRKLAND, R. E.
Reactance-tube frequency
control.
Harvard Univ. - Underwater Sound
Lab.
Jan. 5, 1944 21p.

There are at least three basic
circuits available for varying the
frequency of conventional
high-frequency oscillators as a
function of control voltage. Of
these, there is one that, though
little more complex than the
others, seems to offer greater
possibilities. This paper examines
the three circuits briefly, and
determines their limitations, and
develops a design procedure for the
superior circuit that makes
possible the determination of the
amount and seriousness of departure
from ideal operation. Drawings are
included.

H227 1278
NDRC lead angle computer.
Harvard Univ. - Underwater Sound
Lab.
N.D. v.p.

This report is a description of
a lead angle computer design for
use with a bearing recorder in

set of 6 calibrated lag lines for 60 deg pattern shift with frequencies of 18, 20, 22, 24.5, 60, and 70 kc, and all necessary cables and connectors. A calibration oscillator-amplifier, a sound-gear monitor, or a sound-gear driver can be used with the unit as a generator of electrical energy and the sound transmitter used may be a monitor transducer or any other flat frequency-response transducer. A detailed discussion of the circuits of a split projector, and of the directivity pattern produced by it, is included in the report and data and curves for sample patterns are given. Instructions for installing, operating, and checking the performance of the set, together with suggested data sheets for operating and maintenance checks, are given and the report includes a list of electrical and mechanical parts for the set.

H238 1283
KNAUSS, H. P.
Sonic-locator development, II MR sonar (the rotoscope).
Harvard Univ. - Underwater Sound Lab.
Feb. 5, 1944 v.p.

This report is concerned with the development of the rotoscope, an echo-ranging device that scans the entire horizon continuously. This is done by transmitting sound from an omnidirectional projector and receiving on a mechanically rotated directional microphone. Plan position indication (PPI) is employed. The rotoscope proved useful as a laboratory tool in the advancement of sonic-locator development and as a forerunner of the improved scanning method known as commutated-rotation sonar (CR sonar). Problems to be met in devising satisfactory scanning

systems are discussed, and the scanning technique exemplified in the rotoscope is compared with present searchlight procedures.

H241 1284
BUNDY, F. P. and CAMPA, L. W.
Efficiencies of consolidated and unconsolidated stack transducers in castor oil and in water.
Harvard Univ. - Underwater Sound Lab.
Feb. 10, 1944 v.p.

Several months ago, this laboratory initiated a vigorous program of transducer development in connection with scanning sonar. Five different types of laminated-stack transducers were tested. The results of these tests were not as conclusive as was desired.

H245 1285
CR/ER sonar installation on USS SARDONYX.
Harvard Univ. - Underwater Sound Lab.
Feb. 21, 1944 v.p.

The CR/ER Model 1, Serial 1, is an echo-ranging device capable of scanning rapidly in bearing. It indicates the presence of reflecting objects within acoustic range on a cathode-ray plan-position indicator, combined with a hand-trained receiving beam suitable for standard echo-ranging procedure. This memorandum describes the equipment as installed. The electronic switching device (called ER, or electronic rotation), which can be substituted for the capacitive commutator, is not included in the present installation. Drawings and photos are included.

H246 1286
HANDEL, N. E.
BDI training aid for use with
Sangamo attack teacher.
Harvard Univ. - Underwater Sound
Lab.
Feb. 21, 1944 v.p.

In designing a BDI training device to be used with the Sangamo attack teacher, solutions had to be found for certain specific problems. It was necessary to design a 20-kc signal generator and, then, devise a means of coordinating its operation with that of the attack teacher. In addition to simple coordination, the unit had to produce the proper right-left-center indications on the BDI screen to correspond to the deviation of the projector bearing from the actual bearing of the submarine. The means used in the BDI training aid to meet these requirements with the QFA-3 attack teacher are described. Photos and drawings are included.

H247 1287
BDI sample traces.
Harvard Univ. - Underwater Sound
Lab.
Feb. 21, 1944 v.p.

The sample traces shown in this memorandum are copied from wall charts that have been used in classroom instruction on BDI given at ASWIS, Boston Navy Yard. The four charts cover bow target, beam target, quarter target, and extreme range. In each case, sample BDI traces are shown for "target to left of center," "target centered," and "target to right of center." A sample sound range recorder trace is given for each of the three types of target. An explanation of each chart is also provided.

H253 1288
Report on BDI operation.
Harvard Univ. - Underwater Sound
Lab.
Mar. 27, 1944 v.p.

The data on BDI operation reported herewith were taken on USS SYLPH. This report is intended to be a reasonably complete quantitative analysis of the data that were taken. The major conclusions reached are as follows: (1) during search, BDI is useful in giving a visual check on contacts; (2) during attack BDI bearings are more reliable and are obtained more frequently, and make the Doppler effect more easily recognizable; and (3) of the advantages of BDI include production of an almost broken sound range-recorder trace and comparative ease of operation in training. Drawings and graphs are included.

H258 1289
BROOKS, H. and BLACHMAN, N. M.
Vibrations of a rectangular
frame.
Harvard Univ. - Underwater Sound
Lab.
Apr. 5, 1944 v.p.

Most of the theoretical and experimental work on transducers in this laboratory has been concerned with purely longitudinal vibrations. Where flexure has entered the picture, it has been a spurious or undesired oscillation not generally explained by the theory. This memorandum, however, considers the theory of a transducer that consists of a rectangular frame constructed of nickel laminations, somewhat after the manner of a rectangular transformer core. Such a transducer relies for its magnetostrictive effect on the interaction of flexural and compressional vibrations.

H261 1290
WOOTEN, B. A. and SAUNDERS, N. B.
Operational bearing recorder.
Harvard Univ. - Underwater Sound
Lab.
Apr. 10, 1944 v.p.

The operational bearing recorder was primarily designed to meet the need for an instrument that would make a continuous record, over a given period of time, of both true projector bearings and the target bearings called by the sound operator. With such a record, it is possible to study and evaluate operator performance carried out under a variety of conditions and making use of different operating techniques. Other uses to which the device might be put were found in the course of experimentation and will be found listed in the next section of this report.

H263 1291
Acoustic marine speedometer.
Harvard Univ. - Underwater Sound
Lab.
Apr. 28, 1944 v.p.

This report describes the work done on the acoustic marine speedometer by the Harvard Underwater Sound Laboratory. Three types of such speedometers were investigated: (1) the steady-state acoustic marine speedometer (SAMS), (2) the acoustic marine pinging speedometer (AMPS) and (3) the phase acoustic marine speedometer (PAMS). This report covers the theoretical background, description of equipment, and results obtained for each of the three approaches to the problem. Because of the press of other investigations, work on the AMS project has been suspended. However, certain proposals for future work on the problem have been included at the end of this report.

H264 1292
PAN, S. T. and WOOTEN, B. A.
Magnetic properties of 45
Permalloy.
Harvard Univ. - Underwater Sound
Lab.
Apr. 30, 1944 v.p.

The design and construction of magnetostrictive transducers constitute an important part of the program of the Harvard Underwater Sound Laboratory. Such work involves the measurement and study of the magnetic and magnetostrictive properties of materials which might be used in transducer construction. This memorandum reports on measurements of the magnetic properties of annealed commercial 45 permalloy (55 percent Fe, 45 percent Ni).

H268 1293
Program analysis, May 10 and
11, 1944.
Harvard Univ. - Underwater Sound
Lab.
May 10 and 11, 1944 63p.

This report contains program analyses of scanning sonar systems, sonar improvements, and training programs. In the section dealing with scanning sonar systems, eight complete scanning systems, two attack aids, and five research and development groups are considered. Twenty-one sonar improvements are analyzed. Ten training aids and three categories of personnel assistance are discussed. A personnel summary and a schedule are included.

H270 1294
Extended-range monitor.
Harvard Univ. - Underwater Sound
Lab.
May 20, 1944 v.p.

This memorandum gives instructions for extending the range of the Model 5C or 5E sound-gear monitor (underwater-sound portable testing equipment) from 17 to 26 kc to 17 to 71 kc. The procedure described is that which was followed in converting a monitor unit (Model 5C, No. 46) for use by field engineers at Pearl Harbor. The converted unit is referred to as Model 5E Special. Development is underway on an expanded frequency monitor with a frequency range of 7 to 71 kc which, when obtainable, would replace the converted model.

H271 1295

Comparison of BDI systems.
Harvard Univ. - Underwater Sound Lab.
May 20, 1944 19p.

In this report the principles of operation of the following five BDI systems are compared: (1) Harvard Model X-3, a simultaneous lobe-comparison system formerly called SLC, (2) Harvard Model X-4, a modulation system, (3) RCA's vector bearing indicator (VBI), a sum-and-difference system which is also called right-left indicator (RLI), (4) Harvard undesignated, a sum-and-difference system similar in behavior to the VBI, and (5) BTL's phase actuated locator (PAL), which has been used only for noise listening as distinguished from echo ranging. The principle of operation of each one is described and they are compared with respect to how well they satisfy requirements for echo-ranging and listening receivers.

H275 1296

Distribution of personnel.
Harvard Univ. - Underwater Sound Lab.
June 5, 1944 14p.

This report presents proposed modifications of the program and of personnel assignments listed in the program-analysis report of May 10, 1944. The programs that are affected included: (1) scanning-sonar systems, (2) depth-determination systems, (3) sonar improvements, and (4) training programs.

H278 1297

Instructions for use of phase-sensitivity test unit and variable attenuator.
Harvard Univ. - Underwater Sound Lab.
June 9, 1944 9p.

The experience of a number of field engineers has demonstrated a need for some type of portable signal generator to use in properly aligning the BDI on board ship. The phase-sensitivity test unit and variable attenuator are intended for use with the sound-gear monitor (Harvard Models 5C and 5E) (underwater sound portable testing equipment, OAX models) so that the combination may serve as such signal generator. This instruction manual includes drawings.

H279 1298

RUTHERFORD, C. R. and GRAY, D. E.
BDI dynamic demonstrator.
Harvard Univ. - Underwater Sound Lab.
June 15, 1944 5p.

The BDI dynamic demonstrator is intended for use in demonstrating to student sound operators the circuits and operation of Bearing Deviation Indicator, Model X-3. It enables a student to trace the different parts of the BDI circuit and observe the specific changes in performance that are caused when various maintenance-type adjustments are made in the circuit. Photos are included.

H280 1299
QH sonar.
Harvard Univ. - Underwater Sound
Lab.
June 17, 1944 1p.

QH sonar is an echo-ranging system alert in all directions by scanning rapidly in bearing and showing the presence of all reflecting objects with acoustic range on a cathode-ray plan position indicator. This report includes a sketch that illustrates the system.

H282 1300
HANDEL, N. E. and WOOTEN, B. A.
Operator-training equipment.
Harvard Univ. - Underwater Sound
Lab.
June 20, 1944 v.p.

This report describes in detail the operator-training equipments (OTE), Models 2 and 10, developed by the Harvard Underwater Sound Laboratory. OTE, Model 2, is a cam-actuated training aid that furnishes accurately simulated submarine-attack data to a single student operator. OTE, Model 10, is a proposed modification of Model 2, by means of which a number of students can be trained simultaneously. The report describes the operation and use of both models. The electronic and mechanical features of the two are discussed in detail and photographs, student-operator records, and circuit diagrams are included.

H284 1301
Instructions for 60-kc echo repeater.
Harvard Univ. - Underwater Sound
Lab.
June 22, 1944 9p.

The echo-repeating gear is contained in a standard 19 in. enclosed relay rack and is composed of seven units. Several drawings are included with the instructions for the 60-kc echo repeater.

H287 1302
WATSON, R. B.; DAVIDSON, H. R.; and
WOOTEN, B. A.
Progress report on Attack
Director, Mk III.
Harvard Univ. - Underwater Sound
Lab.
June 30, 1944 v.p.

The Attack Director, Mk III, is designed for use by surface ships during attacks on submarines. It provides a course-to-steer for the attacking ship and predicts time-to-fire for either depth or ahead-thrown charges. Portions of the equipment located near the sonar stack are the slant-range correction recorder, the bearing recorder, and the computer. Input information fed into the director consists of range and bearing of the target, course and speed of own ship, and constant quantities which depend on the type of charge to be employed in the attack. This report describes the Attack Director, Mk III, gear in detail with respect to basic principles, construction, operation, and application.

H289 1303
Training program.
Harvard Univ. - Underwater Sound
Lab.
July 1, 1944 6p.

This report is concerned with (1) training devices and aids, and (2) field training assistance. Nine different ASW training devices and aids are discussed. The work of a special group of engineers, who participate in training activities, is summarized.

H292 1304
IS-WAS text (cover missing).
Harvard Univ. - Underwater Sound
Lab.
1944 97+p.

This text is intended primarily to give the reader a working knowledge of the bearing-deviation indicator. Fundamentals of echo-ranging, as well as of some equipment such as transducers (projectors) on which the BDI depends for its operation, are briefly reviewed. The meaning of directivity of patterns and response curves and the method of measuring them by means of the Model OAX monitor are also explained. Following an analysis of the principle used for bearing-deviation indication is a detailed description of the BDI unit, followed by a summary of other new developments. The final chapter is on the use of BDI as an aid to conning an attack. Appendices and a glossary of terms are included to minimize the necessity for consulting reference material and, at the same time, to keep the text as clear and concise as possible. Drawings and photographs are included.

H294 1305
HOUSTON, C. E.; WOOTEN, B. A.; and
GRAY, D. E.
The monitor as a vacuum-tube
voltmeter.
Harvard Univ. - Underwater Sound
Lab.
July 10, 1944 v.p.

Instructions are given in this memorandum for adapting a Model 5C or 5E sound-gear monitor (underwater sound portable testing equipment, OAX type) for use as a vacuum-tube voltmeter. These modifications in no way interfere with the normal functions of the

device as a monitor. Drawings and a photograph are included.

H295 1306
Mechanical geographic attack
plotter.
Harvard Univ. - Underwater Sound
Lab.
July 15, 1944 v.p.

The mechanical geographic attack plotter discussed in this report is a device that plots own-ship's course and target's course during an attack on an enemy submarine. The plot is made on the under side of the plotting paper by automatically controlled pencils. This preliminary report discusses in detail one model of a mechanical geographic attack plotter and describes the plans for a second model that did not progress beyond the design stage.

H296 1307
HARLOW, H. E., and WOOTEN, B. A.
Slant-range correction recorder.
Harvard Univ. - Underwater Sound
Lab.
July 15, 1944 13p.

The slant-range correction recorder described in this report was designed to correct observed slant range for depth and thereby record the horizontal range, i.e., the range of a point on the surface directly over the submerged target. The modified instrument discussed in the report is a part of Attack Director, Mk III. Photographs and drawings are included.

H298 1308
Combined minutes of series of
conferences held in Washington, DC,
July 13-15, 1944.
Harvard Univ. - Underwater Sound
Lab.
July 7, 1944 v.p.

These minutes are the combined experiences and opinions of the personnel who attended these conferences. The following subjects are considered: (1) Submarine conference, (2) NRL transducer network, and (3) ultimate design system.

H302(2) 1309

Minutes of second conference on ultimate sonar system held July 27, 1944.

Harvard Univ. - Underwater Sound Lab.

July 27, 1944 6p.

The second biweekly conference on ultimate sonar-system design was held at the Harvard Underwater Sound Laboratory on July 27, 1944. Three major topics were under discussion: (1) domes, system A (NRL), and (2) system B (HUSL). Systems A and B are concerned with the fire-control projector and its associated equipment.

H305 1310

Instructions for Whale echo repeater.

Harvard Univ. - Underwater Sound Lab.

Aug. 1, 1944 4p.

The Whale is an echo-repeating type of target designed to be towable at depths up to 1000 ft. It is capable of returning echoes over distances comparable to those that would normally be encountered when pinging at the larger class of submarine operating at the same depth. The transducer patterns are such as to permit the same relative-energy distribution as might be expected if the target were a submerged submarine. Two illustrations are included with these operating instructions.

H307 1311
RUTHERFORD, C. R. and WESTEVELT, R. A.
Use of Type OAX sound-gear monitor.

Harvard Univ. - Underwater Sound Lab.

Aug. 1, 1944 v.p.

Installation of a Type OAX sound-gear monitor (Harvard Model 5C) on a submarine for use in coded communication between the submarine and surface ships is described in this memorandum. All of the material in the main body of the memorandum concerns the ARGO installation. The first appendix gives detailed directions for making the necessary changes to convert any Type OAX monitor (Harvard Model 5C or 5E) into a unit that can be used for telegraphic communication. The second appendix consists of operating instructions condensed into a form suitable for attachment to the unit itself.

H314 1312

Agenda for demonstration, 8 August, 1944, - USS GALAXY.
Harvard Univ. - Underwater Sound Lab.

Aug. 8, 1944 3p.

The devices to be demonstrated include the following: (1) Harvard sonar console, (2) Doppler-controlled gain for BDI (DGG), (3) Doppler indicator, (4) automatic target training in conjunction with Doppler-enhanced BDI, and (5) Dopplerized echo repeater. A very brief discussion of each device is provided.

H320 1313
SMITH, F. H.; SCHUCK, O. H.; and MORTON, R. C.

Mechanical geographic attack plotter.

Harvard Univ. - Underwater Sound Lab.

Aug. 25, 1944 11p.

The mechanical geographic attack plotter discussed in this report is a device that plots own-ship's course and target's course during an attack on an enemy submarine. The plot is drawn by automatically controlled pencils on the under side of plotting paper. While it was recognized that the one preliminary model which was constructed and tested was not the complete answer to the problem, its performance indicated that an adequate device could be built. Following these tests, design was undertaken on a second model, but this was not constructed. The present report gives a brief description of attack plotters, in general, followed by detailed consideration of the design and construction of the first Harvard model and a discussion of the design of the second model. Photos and drawings are included.

H324 1314
 HANDEL, N. E.
 BDI training aid.
 Harvard Univ. - Underwater Sound Lab.
 Sept. 5, 1944 11p.

The operator training equipment (OTE-8) described here is an adapter unit to convert the RCA advanced bearing teacher, Type QFD, for use in BDI training. The OTE-8 equipment furnishes a signal of the same kind as that which comes from the water to a standard shipboard BDI unit and so enables the BDI associated with the QFD bearing teacher to exhibit traces that simulate those found in actual service. The visual signal appears simultaneously with the audible one produced by the QFD unit. Photos and a drawing are included.

H328 1315
 QH sonar, model II, Serial I, installation on USS CYTHERA.
 Harvard Univ. - Underwater Sound Lab.
 Sept. 13, 1944 v.p.

The purpose of this memorandum is to describe the installation of the QH sonar, Model II, Serial I, equipment aboard USS CYTHERA. This equipment is an echo-ranging device capable of scanning rapidly in bearing, so as to indicate the presence of any and all reflecting objects within acoustic range on a cathode-ray plan position indicator (PPI), combined with a hand-trained receiving beam suitable for standard echo-ranging procedure. Drawings and photos are included.

H330 1316
 Description dual-frequency driver.
 Harvard Univ. - Underwater Sound Lab.
 Sept. 22, 1944 11p.

This driver is designed to provide energy for a horizontal and vertical sonar system in which different frequencies, ping lengths, and power may be employed in the respective channels. It is intended primarily to provide the energy for a four-way split QBE crystal projector, in which the horizontal-beam half may be operated at a frequency within the range between 18 and 35 kc and the vertical beam half may be operated at a frequency within the range of 35 to 70 kc. Several illustrations and schematic wiring diagrams are included.

H331 1317
 SCHUCK, O. H. and WATT, J. P.
 Split-projector test unit.
 Harvard Univ. - Underwater Sound Lab.
 Jan. 31, 1944 28p.

A portable split-projector test unit (SPTU) has been developed for accurately testing, in calibration stations, projector test-gear arrangements, and on shipboard, the effectiveness of split projectors in BDI use. It consists essentially of a carefully made BDI circuit up to and including the lag line. It is housed in 2 boxes, 1 of which contains the operating circuits while the other contains a low-impedance output transformer, a set of 6 calibrated lag lines for 60 deg pattern shift with frequencies of 18, 20, 22, 24.5, 60, and 70 kc, and all necessary cables and connectors. This instruction book provides detailed directions for setting up, operating and maintaining the split projector test unit (SPTU). The manual also contains a description of the equipment and a discussion of the principles on which its operation is based. Photos, graphs, and drawings are included.

H338 1318
Instructions for converting the Type 5C sound-gear monitor for use as a vacuum-tube voltmeter. Harvard Univ. - Underwater Sound Lab. Oct. 9, 1944 9p.

This memorandum gives instructions for converting a Model 5-C sound-gear monitor for use as a vacuum tube voltmeter. The modifications in no way interfere with the normal function as monitor. The vacuum-tube voltmeter utilizes a cathode-follower input circuit which replaces the input transformer when the vacuum-tube voltmeter is in use. The cathode follower provides a high-impedance input circuit. There is no voltage gain in this stage. The VTVM has these desirable characteristics: relatively high input impedance, uniform frequency response from 2.5 to 70 kc, and a range from 1 mV to

100 V. The VTVM can be used while the monitor is delivering a signal on 'Send'. The modifications in the wiring are shown clearly in the schematic diagram at the end of this memorandum. When the VTVM switch is in the OFF position, the voltmeter input is switched off and the amplifier is coupled (as originally) to the hydrophone receptacle. Graphs, illustrations, and photos are included.

H341 1319
Minutes of conference on echo repeaters held 5 October 1944. Harvard Univ. - Underwater Sound Lab. Oct. 16, 1944 3p.

The following topics were discussed at the conference: (1) responsibility of the various laboratories for practice targets, and (2) functional characteristics of targets required by the five laboratories.

H342 1320
Proposed method for measuring the signal-reflecting strength of a submarine. Harvard Univ. - Underwater Sound Lab. Oct. 18, 1944 3p.

This memorandum presents a method by which the signal-reflecting strength of a submarine can be measured quantitatively. In essence, the method comprises the use of a submarine-mounted calibrated echo repeater that receives a transmitted signal simultaneously with the submarine and reflects it back after a predetermined time delay. The purpose is to permit a direct comparison, at the transmitting point, of the submarine echo and a signal from a source of known reflecting strength.

H343 1321
Operating instructions for
dynamic monitor.
Harvard Univ. - Underwater Sound
Lab.
Oct. 18, 1944 10p.

The dynamic monitor is an instrument designed for measuring the figure of merit of sonar echo-ranging equipment which transmits a single-frequency pulse. These operating instructions include (1) a statement of purpose, (2) specifications, (3) description of controls, (4) operating instructions, (5) theory, and (6) limitations. Drawings are included.

H350 1322
SCHUCK, O. H. and HANCOCK, J. O.
Artificial projector.
Harvard Univ. - Underwater Sound
Lab.
Nov. 1, 1944 15p.

This report describes a device, called the artificial projector, which, as its name implies, simulates the performance of an actual sonar projector. Its principal applications are in (1) training operators and maintenance men in the making of measurements on sonar projectors, and (2) providing typical signals for use in testing sonar-receiving equipment. Drawings and photos are included.

H355 1323
Status report as of 1 December
1944.
Harvard Univ. - Underwater Sound
Lab.
Nov. 24, 1944 64p.

This report discusses the status of 46 projects.

H359 1324
Installation manual for
submarine sonar system.
Harvard Univ. - Underwater Sound
Lab.
Nov. 30, 1944 4p.

This report contains some brief general instructions for installing submarine scanning-sonar systems. Topside-mounted transducers, bottomside-mounted transducers, indicator boxes, transmitters, receivers, SRO chassis, and intercabling are discussed. The text refers to figures that are missing in this copy of the preliminary edition of the installation manual.

H360 1325
Some factors affecting deep
submarine attacks.
Harvard Univ. - Underwater Sound
Lab.
Dec. 1, 1944 v.p.

A number of factors contribute to the difficulties encountered in making successful attacks on submarines at depths greater than 400 ft. Among them are (1) early loss of sonar contact, (2) increased dead time, (3) relatively great difference between slant range and horizontal range, and (4) refraction effects. This report examines the geometry of deep submarine attacks, as affected by these four factors, to determine requirements that must be met in the design of sonar gear for use in such attacks. General conclusions are (1) depth information must be accompanied by bearing data to be adequate during the final stages of an attack on fast deep submarines, and (2) errors in depth determination caused by refraction can be disregarded if echo-ranging conditions are good, or if the depth angle is large. Graphs are included.

H361 1326
Instruction manual for
artificial projector.
Harvard Univ. - Underwater Sound
Lab.
Dec. 1, 1944 v.p.

This manual describes the operation and use of the artificial projector, designed primarily to serve as an aid in teaching the use of the sound-gear monitor for making measurements on magnetostrictive projectors. The manual provides samples of its sound patterns, both as an unsplit and as a split projector. Photos, diagrams, and curves are included.

H362 1327
Electronic automatic search.
Harvard Univ. - Underwater Sound
Lab.
Dec. 1, 1944 13p.

Electronic automatic search (EAS) comprises a system of electronic circuits that can be employed to operate a ship's sonar gear automatically during the search period in accordance with a previously determined pattern. The report lists the requirements it was felt the EAS equipment should meet and describes in detail the construction and operation of the gear. Included are a history of the project, performance specifications, and a list of parts for the device.

H363 1328
Projector-test gear (PTG).
Harvard Univ. - Underwater Sound
Lab.
Dec. 1, 1944 18p.

The projector-test gear (PTG) comprises equipment suitable for supporting and handling sonar projectors while they undergo performance tests previous to installation on board ship. Auxiliary equipment employed in the test procedure consists of two sound-gear monitors (sonar portable test equipment, Type OAX or OCP). A detailed description of PTG equipment is given in the main body of the report, as well as a discussion of projector test

procedure and methods of evaluating results. The report includes a history of the project, an appendix, and a bibliography.

H363.5 1329
Split-projector test unit (SPTU).
Harvard Univ. - Underwater Sound
Lab.
Dec. 1, 1944 31p.

The split projector test unit (SPTU) was developed to provide a rugged portable device for checking the performance of split projectors. It can be used either on board ship or at shore calibration stations. Auxiliary equipment includes a suitable generator, such as a sound-gear monitor; a measuring amplifier and indicator, which may be the amplifier unit of a monitor or a sonar-gear receiver; and, under certain conditions, a filter junction box. Tests that can be made on a split projector with the SPTU include measuring directivity patterns and determining the BDI deflection curve. This report gives a detailed description of the equipment and its applications. Included are complete operating and maintenance instructions, a parts list, a list of shop drawings, and a bibliography.

H364 1330
Operator-training equipment,
Models 2 and 10.
Harvard Univ. - Underwater Sound
Lab.
Jan. 1, 1945 25p.

Models 2 and 10 of operator training equipment (OTE) were designed to provide sonar operators with training and practice in the manipulation of sonar gear under simulated-attack conditions involving typical changes in target bearing, range, and Doppler. OTE, Model 2, which has been built and successfully tested, can be used to train one operator at a time. The simulated-attack data are introduced

into the equipment by means of programs that can be prepared in such a way as to duplicate a previous actual attack on a submarine. The unit automatically traces a pencil record of the student's performance while he conducts the attack. OTE, Model 10, is a proposed modification of Model 2, with which a number of students could be given training and practice simultaneously. This report describes in detail and illustrates the operation and use of both models. Sample student records and complete schematic diagrams are given. Included in the report are a history of the project and two appendices, one of which lists all the OTE equipments while the other gives detailed instructions for making the program cams.

H365 1331
Training assistance to the Navy.
Harvard Univ. - Underwater Sound Lab.
Jan. 10, 1945 6p.

The training assistance given to the Navy by the Harvard Underwater Sound Laboratory in the operation of its devices has been regarded by the Laboratory as an obligation that it incurred by developing the devices, which include the bearing-deviation indicator and the scanning-sonar systems.

H369 1332
Instruction manual for submarine scanning-sonar system.
Harvard Univ. - Underwater Sound Lab.
Feb. 1945 v.p.

This instruction manual describes the use of the submarine scanning sonar system, which utilizes a rotating beam of sensitivity to scan the entire area surrounding the echo-ranging vessel. Included are photos, drawings, curves, and tables.

H375 1333
Instruction manual for BDI dynamic demonstrator.
Harvard Univ. - Underwater Sound Lab.
Feb. 10, 1945 15p.

This instruction manual describes the use of the BDI Dynamic demonstrator, which consists of a complete X-3 BDI unit built into a cabinet 7 ft by 3 1/2 ft by 13 in. The primary purpose of this unit is to facilitate classroom instruction in, and demonstration of (1) BDI-circuit principles, (2) proper tuning and aligning procedure, (3) step-by-step signal tracing, and (4) voltage and resistance measurements. Photos are included.

H378 1334
Operation and maintenance instructions for the operational-training equipment, Model 8, preliminary edition.
Harvard Univ. - Underwater Sound Lab.
Feb. 19, 1945 33p.

This instruction manual describes the use of operational-training equipment, Model 8 (OTE-8), which is an attachment designed to adapt the QFD advanced bearing teacher for use with the BDI (bearing deviation indicator). The OTE-8 is mounted inside the QFD cabinet. Included are photos, drawings, and tables.

H380 1335
Operator-training equipment, Model 4.
Harvard Univ. - Underwater Sound Lab.
Mar. 1, 1945 17p.

Operator-training equipment, Model 4, is an auxiliary device for adapting early models of the Sangamo attack teacher for use in BDI instruction. The equipment generates signals suitable for direct application to standard BDI units and produces reverberation and

bearing-deviation indications that are synchronized with the audible signals generated by the attack teacher. Three units of OTE-4 were constructed to fill an interim instructional need prior to the delivery by Sangamo Electric Co. of modernized attack-teacher equipment having a built-in BDI feature. This report describes the OTE-4 equipment in detail and gives information concerning its operation and maintenance. Included are photos, diagrams, appendixes, and a bibliography.

H381 1336
Operational bearing recorder.
Harvard Univ. - Underwater Sound Lab.
Mar. 1, 1945 19p.

To fill a local need expressed by officers of USS SYLPH, a Barber-Coleman recorder was modified to provide a graphic record of two bearings plotted against time. One of them is introduced by a synchro-servo mechanism, which yields automatically a record of the true bearing of the sonar projector. The other is provided by a second manually controlled stylus, which allows simultaneous recording of the bearings called by the sonar operator. Comparison of the two traces permits objective evaluation of the performance of the operator in following the bearing of a target. Constructional details of the instrument are presented and a series of recommendations are made for possible improvements in the design. Included are photos, diagrams, graphs, an appendix, and a bibliography.

H383 1337
Operator's manual for sonar portable testing equipment, Model X-OCF (wide range monitor).
Harvard Univ. - Underwater Sound Lab.
Mar. 1, 1945 36p.

This manual describes sonar portable testing equipment, Model X-OCF (sound-gear monitor), designed for use in testing standard Navy sonar equipment to maintain it at highest operating efficiency. This monitor is similar in purpose and principles of operation to the OAY series of underwater-sound portable testing equipment. It differs from these testing equipments mainly in its operation over a larger frequency range (7 to 70 kc), which makes it possible to use the Model X-OCF monitor to test a great variety of sonar equipments. Included are photos, diagrams, and graphs.

H382 1338
QH depth-scanning sonar (experimental model), installation on USS CYTHERA.
Harvard Univ. - Underwater Sound Lab.
Mar. 1, 1945 v.p.

This manual describes the use of the depth scanning sonar (DSS) experimental model that was designed and constructed to give information on the location of a subsurface target in terms of bearing, range, and angle of depression. Included are numerous drawings and photos.

H399 1339
Vector impedance locus plotter.
Harvard Univ. - Underwater Sound Lab.
March 15, 1945 15p.

This report describes the vector impedance locus plotter (VILP) that traces the locus of the tip of an impedance vector, $R + jX$, by plotting X against R on the face of a CRU tube as the frequency of the applied signal is varied. Included are diagrams, drawings, and photos.

H401 1340
Instruction manual for BDI
adjustment signal generator, OTE-9.
Harvard Univ. - Underwater Sound
Lab.
Mar. 20, 1945 28p.

This manual describes the BDI
adjustment signal generator, which
is a device for supplying signals to
the input of a BDI for testing,
adjustment, and training purposes.
The signals provided simulate those
produced by a split QC projector of
the type used in BDI installations.
The primary use of the signal
generator is in the training of BDI
maintenance and servicing
personnel. When used in conjunction
with a standard BDI unit, or the BDI
dynamic demonstrator developed for
this purpose, it facilitates
classroom demonstration of the BDI-
circuit principles and laboratory
practice in signal-tracing technique
and adjustment of the BDI. Included
are tables, photos, and drawings.

H405 1341
Analysis of Canadian ship-noise
modulation records.
Harvard Univ. - Underwater Sound
Lab.
Mar. 29, 1945 13p.

In the development of certain
devices at this Laboratory, we have
been confronted with lack of
information concerning the
characteristics of ship's noise.
Some of the factors about which more
information is desired are the
energy distribution of ship's noise
as a function of frequency and the
amount and frequency of modulation
present. It was decided, therefore,
that as soon as time was available,
we would make a study of all
available ship's-noise records.
This report covers only one aspect
of the problem, namely, the relation
between modulation frequency and the
number of propeller blades and
propeller rpm. No hitherto unknown
facts are disclosed here, but so far

as we know this is the first report
that attempts to tabulate such
information. The study will be
continued as more data become
available; and further reports may
be issued.

H409 1342
Operator training equipment,
Model 9 (BDI signal generator).
Harvard Univ. - Underwater Sound
Lab.
Apr. 1, 1945 19p.

Operator-training equipment,
Model 9 (BDI signal generator), is a
signal generator designed to provide
test signals for standard bearing-
deviation indicator units or the BDI
dynamic demonstrator. The signal
provided can be either continuous or
keyed to simulate a 1000-yd echo and
the circuits are arranged to provide
right or left signals on the BDI
equipment, such as might be obtained
in service under ideal conditions.
OTE-9 is primarily useful as a
signal source for the BDI dynamic
demonstrator or for the adjustment
or alignment of standard BDI units.
The construction of the device and
details of its operation are
presented in this report. Included
are photos, appendices, and a
bibliography.

H412 1343
The dynamic monitor.
Harvard Univ. - Underwater Sound
Lab.
Apr. 10, 1945 49p.

The dynamic monitor is a device
designed to provide a numerical
index of the overall acoustic
performance of sonar echo-ranging
equipment. The monitor consists of
a transducer and an electronic
unit. When a transmitted sound
pulse, or ping, from the ship's
projector reaches the monitor
transducer, a delayed pulse
analogous to an echo is generated in
the monitor electronic unit and
automatically returned to the gear

being tested. From the settings of the monitor controls, one can determine by a simple calculation the ratio of the intensity of the ping to the intensity of the minimum echo detectable by the sonar equipment. This ratio, expressed in decibels, is known as the figure of merit of the sonar gear and is a measure of its acoustic performance. The main body of the report consists of a detailed description of the dynamic monitor, including sample results, operating instructions, and theory. The report also contains an historical summary of the development of the monitor, an appendix, and a bibliography.

H415 1344
Instruction manual for BDI dynamic demonstrator.
Harvard Univ. - Underwater Sound Lab.
Apr. 15, 1945 27p.

This instruction manual describes the use of the BDI dynamic demonstrator, whose primary purpose is to facilitate classroom instruction in and demonstration of (1) BDI circuit principles, (2) proper tuning and aligning procedure, (3) step-by-step signal tracing, and (4) voltage and resistance measurements. The BDI dynamic demonstrator can also be used by small groups for laboratory experiments dealing with voltage measurements, signal tracing, and operating adjustments. Included are photos, drawings, diagrams, and curves.

H420 1345
Methods of connecting bearing and depth deviation indicators to a quadrant-split projector (with notes on depth determination).
Harvard Univ. - Underwater Sound Lab.
May 1, 1945 26p.

This report covers work done on methods of connecting two BDI units to a projector split electrically into quadrants for the purpose of simultaneous measurements of bearing and depth angle deviation. Two methods of making the connections were tested and several alternative methods are proposed. Beam-pattern requirements are discussed and measurements are presented, together with results of preliminary operating tests. The use of a split projector for depth determination is discussed and a computation of certain errors arising in the method is presented in an appendix. Included are diagrams, graphs, and a bibliography.

H421 1346
Instruction manual for beeper equipment, an acoustic locating system for recovering lost torpedoes.
Harvard Univ. - Underwater Sound Lab.
May 1, 1945 v.p.

This instruction manual describes the use of the beeper, which is a device designed to aid in the location of torpedoes that are lost during test runs. The transmitting equipment provides for the emission of an acoustic signal from the torpedo being run. This signal is radiated through the water in all directions, both during the run and, unless the equipment is disconnected or damaged, for a period of several days after the run has been completed. Beeper receiving equipment that is carried on a searching boat utilizes the transmitted signal to direct the boat to the vicinity of the torpedo and to ascertain its exact location. Included are photos, diagrams, drawings, and tables.

H424 1347
Anchored-vessel screening.
Harvard Univ. - Underwater Sound Lab.
May 5, 1945 25p.

This report describes a simple semi-automatic echo-ranging system designed for the protection of warships at anchor. The equipment operates as an acoustic analog of search radar, each bearing being searched successively in range. The operating frequency and pulse length are chosen to provide effective operation with small targets. An account of the design and construction of two models is given and the results of limited field tests are summarized. Included are photos, diagrams, an appendix, and a bibliography.

H428 1348
Instruction manual for operator-training equipment, Model 8 (BDI adapter for QFD advanced bearing teacher).
Harvard Univ. - Underwater Sound Lab.
May 10, 1945 23p.

This instruction manual describes the operator training equipment, Model 8 (OTE-8), which is an attachment kit designed to adapt the Model QFD advanced bearing teacher for use with the BDI (bearing deviation indicator). The OTE-8 is mounted inside the QFD cabinet. Included are photos, diagrams, and tables.

H429 1349
Training activities of Harvard Underwater Sound Laboratory.
Harvard Univ. - Underwater Sound Lab.
May 10, 1945 20p.

This report summarizes the training activities of the Harvard Underwater Sound Laboratory. These activities have included informal assistance to Navy personnel in the use of HUSL-developed equipment, specialized lecture and laboratory courses organized for formal instruction of field engineers and naval personnel, and the development of miscellaneous training devices.

These last are described only briefly, since they have been treated more fully in other HUSL completion reports. An appendix contains an outline of the curriculum presented to field engineers, a chronological list of the occasions on which the course was given, and a partial list of the names of the students enrolled in each course.

H433 1350
Operator-training equipment, Model 8 (BDI adapter for QFD).
Harvard Univ. - Underwater Sound Lab.
May 15, 1945 33p.

This report describes operator training equipment, Model 8 (OTE-8), which is an auxiliary device designed to adapt the QFD advanced bearing teacher for instruction in BDI operation. The history, design, and functioning of the equipment, together with directions for its operation and maintenance, are presented here. Included are photos, diagrams, drawings, appendices, and a bibliography.

H440 1351
Dual-frequency driver.
Harvard Univ. - Underwater Sound Lab.
May 25, 1945 21p.

The dual frequency driver is a transmitter designed to deliver energy simultaneously, at two ultrasonic frequencies, to a sonar quadrant-split sonar projector, thus permitting sound beams of different widths to be used for determining the bearing and depression angles of a submerged target. The respective frequencies of the two channels of the driver are separately adjustable, one over a frequency band extending from 18 to 35 kc, the other over a band extending from 35 to 70 kc. The ping length in both frequency bands can be varied from 5 to 100 ms. The power output,

separately adjustable for the two-channels, has a maximum value of 275 W for the combined total into a resistive load of 30 ohms. The body of the report consists of a detailed description of the driver. An historical summary, an appendix, and a bibliography are included.

H453 1352

Time-varied gain for sonar equipment.
Harvard Univ. - Underwater Sound Lab.
June 15, 1945 24p.

Time-varied gain (TVG) is the term applied to a particular type of electronic circuit used to control the gain of a sonar receiver for a given period following emission of the ping. Its effect is to reduce the level, during reception, of the loud initial blast of reverberation, then to restore the receiver gain to normal before arrival of an echo. The principles of operation of the TVG circuit are discussed in detail in this report and installations with several specific types of sonar gear are described and illustrated. Included is a bibliography.

H462 1353

BDI dynamic demonstrator.
Harvard Univ. - Underwater Sound Lab.
June 30, 1945 51p.

The BDI dynamic demonstrator was designed at the request of the West Coast Sound School to provide working demonstration equipment that could be used to teach the theory and operation of the Model X-3 BDI circuit. Auxiliary equipment includes a suitable signal generator, a high-impedance vacuum-tube voltmeter, and a dc volt-ohmmeter. This report gives a detailed description of the equipment and its applications, together with an historical summary

of its development. Included are complete operating and maintenance instructions.

H464 1354

Reverberation controlled gain for sonar equipment.
Harvard Univ. - Underwater Sound Lab.
July 15, 1945 30p.

Reverberation-controlled gain is a specialized form of automatic volume control for sonar equipment. Its function is to adjust the gain of the receiver following each ping so that initial reverberation does not overload the receiver. The receiver gain then is allowed to increase as the reverberation signal decreases in intensity until finally, when reverberation has ceased, the gain is equal to that which would normally be obtained with the existing setting of the receiver sensitivity control. The principles of operation of the RCG circuit are discussed in detail in this report and installations made with several specific types of sonar gear are described and illustrated.

H468 1355

A summary of technical personnel and research projects.
Harvard Univ. - Underwater Sound Lab.
N.D. 10p.

This manual summarizes the projects undertaken by technical personnel at the Harvard University Underwater Sound Laboratory. These projects operate under contracts OEMsr-58 and OEM-287, Division 6, National Defense Research Committee.

H469 1356

Attack director B.
Harvard Univ. - Underwater Sound Lab.
July 30, 1945 40p.

The successful development of scanning-sonar systems that present

submarine-target position information on a plan-position indicator (PPI) raised the question of how an anti-submarine attack should be planned to utilize most effectively the information so presented. The PPI can, of course, be used to deliver range and bearing information for utilization in accordance with standard doctrine. The present line of investigation, however, has been devoted to the possibilities of devising simple computing linkages, or other mechanisms, that, in conjunction with the PPI, can be manipulated in such a way as to indicate directly the proper course to steer. Three experimental models were constructed. To distinguish these devices from other attack aids using fire-control techniques, the name attack director B was assigned to them. When this work was terminated by the transfer of the HUSL sonar program, the experimental program had verified the basic ideas involved, but no finished sea-going models of the equipment had been completed.

H470 1357
Echo-repeater calibrator.
Harvard Univ. - Underwater Sound Lab.
Aug. 1, 1945 51p.

An echo-repeater calibrator consists of equipment used to determine the equivalent sphere size of an echo repeater when simulating a target. Four such calibrators have been constructed by this Laboratory, two of them nonportable and two portable. The first nonportable calibrator was built for the Whale echo repeater and the second was assembled for the Florida Station. The first of the portable models has not been used for local tests, while the second has not been assembled in final form at the time this report was written. The main body of the report consists of a detailed description of the

calibrators, as well as a discussion of the calibration procedures and their use. The report also includes an historical summary, photos, drawings, an appendix, and a bibliography.

H471 1358
Acoustic marine speedometer.
Harvard Univ. - Underwater Sound Lab.
Aug. 15, 1945 48p.

This report describes the acoustic marine speedometer developed by HUSL to provide a means of measuring ship speed with respect to the water by utilizing some underwater acoustic phenomenon that varies with that speed. In the course of this development, the following three types of speedometers were investigated: (1) the steady-state acoustic marine speedometer (SAMS), whose operation depends on the Doppler shift of sound that is continuously transmitted by one transducer and received by another after having been scattered by the water; (2) the acoustic marine pinging speedometer (AMPS), which operates in a manner similar to the SAMS except that a single transducer is employed for both transmitting and receiving, the sound being emitted in pulses rather than continuously; and (3) the phase acoustic marine speedometer (PAMS), which uses two transducers but depends for its operation on a phase lag rather than on Doppler shift. This report covers the theoretical background, description of equipment, and results obtained for each of the three approaches to the problem.

H472 1359
Automatic target training.
Harvard Univ. - Underwater Sound Lab.
Aug. 15, 1945 97p.

This report is concerned with a modification of standard sonar

equipment known as automatic target training (ATT). The purpose of ATT is to maintain the sonar projector automatically and continuously trained on target, once contact has been made. To accomplish this, the ATT unit is supplied with (1) intelligence concerning the bearing of the projector relative to the target from the directional output of the bearing deviation indicator (BDI), and (2) information regarding the range of the target from a range recorder. The ATT chassis utilizes the BDI input to effect training of the projector in azimuth to follow an echo and the range-recorder input to restrict the training to an echo of a particular range. In this manner, a projector and its ATT unit are said to be automatically focused both in azimuth and in range. In the report are included (1) a description of the circuits and devices developed for ATT units and their application to different types of sonar equipment, (2) results of demonstrations and tests of installations on various ships, and (3) proposals for future development. The report also contains an historical summary, an appendix, and a bibliography.

H473 1360
 Preliminary tactical trials of scanning sonar with the Sangamo attack teacher.
 Harvard Univ. - Underwater Sound Lab.
 Aug. 30, 1945 39p.

This report presents the results of preliminary tactical trials of QH scanning sonar, as exemplified by a scanning modification of the Sangamo QFA-5 attack teacher. The scanning modification of the attack teacher was developed and constructed by HUSL, and the trials reported here were conducted by officers and men of the Surface Craft Division, Anti-submarine Development Detachment, Atlantic Fleet. It is tentatively concluded, on the basis

of these trials, that conning from PPI center bearings is feasible and yields results comparable to those obtained using BDI with searchlight-type sonar equipment. No significant sacrifice of attack potential would result, therefore, from the replacement of present echo-ranging equipment with scanning sonar. Current conning and operating doctrines appear to be applicable to QH sonar, although it should be possible to simplify present search and lost-contact procedures to a considerable extent. Technical difficulties prevented evaluation of the scanning-sonar PPI presentation as applied to the Attack Plotter, Mk I. It is recommended that additional attack teacher trials be conducted, and that these results be confirmed by tests at sea. The report includes an account of some attack-teacher runs in which the submarine was conned by experienced submarine officers who were allowed to view the projection screen during the maneuvers.

H474 1361
 Artificial projector.
 Harvard Univ. - Underwater Sound Lab.
 Sept. 1, 1945 35p.

The artificial sonar projector is a 1/3-model of a standard sonar projector designed to permit bench measurements illustrative of directivity patterns and frequency response of a split-sonar projector of either magnetostrictive (QC) or crystal (QJ) construction. The history of the development is given, followed by a description of the model and operating instructions. The functioning of the model depends on a set of coils known as inductive echo simulator coils and the principles of operation of these coils are detailed in an appendix. A second appendix contains a complete list of devices using the

IES coils for various testing and operator-training purposes. A bibliography of HUSL external and internal reports and memoranda on the artificial projector is included.

H475 1362

Echo repeaters.
Harvard Univ. - Underwater Sound Lab.
Sept. 1, 1945 131p.

An echo repeater is an artificial target designed to simulate the reflective properties of an actual vessel, so that echo-ranging equipment can be tested economically and with some measure of control over the target. The first artificial targets developed for checking sonar gear were the passive targets, generally hollow spheres or arrangements of triplanes covered with reflecting material. An echo repeater consists of a receiving and a transmitting transducer coupled by an amplifier. In use, the echo repeater is suspended or towed below the surface of the water at some distance from the ship whose gear is being checked. A ping emitted by the echo-ranging projector is picked up by the receiving transducer, amplified, and retransmitted to act as an echo for the pinging vessel. The main body of the report consists of a detailed description of the construction and performance of the passive targets and echo repeaters developed by the Harvard Underwater Sound Laboratory (HUSL). Also included in the report are an historical summary, recommendations for future work, and a bibliography.

H476 1363

Attack director III and related developments.
Harvard Univ. - Underwater Sound Lab.
Sept. 1, 1945 91p.

This report deals with the development of equipment that uses

sonar information to compute the course to follow and the time to fire during attacks on submarines. The history of the work outlines the participation in this development of HUSL, as well as of the Special Studies Group of Division 6, NDRC, the Naval Research Laboratory, and the Columbia University Laboratory at New London, CT. The accompanying mathematical analysis is given in detail. Description of equipment in this report is limited to the three devices built by HUSL, namely, a breadboard bearing recorder, the Mk II lead-angle computer, and Attack Director Mk III. Test results on these, and on the two devices built by the New London Laboratory, are summarized and the recommendations and conclusions based on the findings of these experiments are stated. A bibliography of HUSL external reports and internal memoranda is included.

H481 1364

Portable polar-chart recorder.
Harvard Univ. - Underwater Sound Lab.
Sept. 15, 1945 47p.

The portable polar-chart recorder (PPCR) automatically plots voltage level, in decibels, on polar-graph paper. Its primary application at HUSL has been in the preparation of directivity patterns showing the distribution of sound intensity with angle. The principle of the recorder was also applied to a strip-type recorder. The investigation of the servo mechanism used in the portable polar-chart recorder is a typical example of these servos. This report describes its construction and operation in detail, including both the first model built by the laboratory and a second unit built for HUSL by the Foxboro Company. This report also describes the general investigation

of servo mechanisms, with a few brief examples of problems somewhat different from the portable polar-chart recorder.

H482 1365
Field studies of sonar domes.
Harvard Univ. - Underwater Sound
Lab.
Oct. 1, 1945 81p.

This report is concerned with the effect of streamlined domes on the directivity patterns of sonar projectors. When the Harvard Underwater Sound Laboratory (HUSL) made its first experimental installations of bearing deviation indicator (BDI) equipment, it was discovered that, in many cases, the BDI would not function properly because the projector directivity patterns were being seriously distorted by the streamlined dome enclosing the projector. At the request of the Navy, HUSL undertook to investigate the problem. A large number of projector pattern measurements were made. From the results of these measurements, the nature of the pattern deterioration produced by domes was determined. Appropriate remedies in the form of improved dome design and filling fluids effected a solution of the problem. The report contains a description of the various domes that were studied, an outline of the measurement technique employed, and an analysis of the results of the measurements. A bibliography is also included.

H483 1366
Operator-training equipment,
Model 5 (modification of Sangamo
QFA-5 attack teacher and associated
equipment for scanning-sonar
training).
Harvard Univ. - Underwater Sound
Lab.
Nov. 1, 1945 83p.

The designation operator
training equipment, Model 5 (OTE-5),

has been applied to the development of training equipment for instruction in scanning-sonar operating techniques. The development began with a simple simulative unit that provided a typical spiral-sweep display as obtained in QH- and OK-type sonar equipment. The objectives of the project were extended with the acquisition of a unit of the QFA-5 Sangamo attack teacher and associated equipment. The true-bearing follower line of the attack teacher was modified for automatic operation and the attack plotter was altered to permit the spiral-sweep display to be presented without sacrifice of other features of the geographical plotter. An improved model of the scanning-simulator unit was developed to utilize various signals available from the attack teacher and to provide for complete control of the attack problem in the usual way from the attack-teacher console. The report includes an historical summary of the development work, detailed descriptions of the construction and operation of the equipment transferred to AsDevLant, and extensive recommendations concerning desirable improvements in the equipment.

H484 1367
Sound-gear monitor, underwater-
sound portable test equipment.
Harvard Univ. - Underwater Sound
Lab.
Nov. 1, 1945 153p.

This report is concerned with the sound-gear monitor (SGM), of both portable and installed types, developed by the Harvard Underwater Sound Laboratory (HUSL). The purpose of the SGM is to obtain information concerning the transmitting and receiving characteristics of standard Navy echo-ranging equipments. By such measurements, a sonar gear-can be turned and adjusted for optimum

performance, checked for operational deterioration, and compared with other sonar systems. The report consists of an historical summary, description of the various monitor models as developed by the Laboratory, special applications, and performance evaluations of the manufactured units. Recommendations for future work and a bibliography are included.

H485 1368
 Bearing-deviation indicator.
 Harvard Univ. - Underwater Sound Lab.
 Nov. 1, 1945 v.p.

The bearing-deviation indicator (BDI) with which this report is concerned is a device that indicates on a cathode-ray tube screen, for each echo received, whether the target is to the right or to the left of the bearing of the ship's sonar projector. In operation, each ping of the sonar equipment produces at the lower edge of the CRO screen a luminous straight line, except for random deflections caused by reverberation. When an echo is received, the moving spot is deflected to the right or left, depending on whether the reflecting target is to the right or left, respectively, of the projector bearing. If the projector is trained on the target, the spot either brightens without deflecting or shows a slight double deflection. The distance the spot travels up the screen before deflecting or brightening is proportional to the range of the target. The report contains a summary of the basic principles of BDI operation and a critical discussion of the various methods of achieving bearing-deviation indication. Early work by HUSL is recapitulated in an historical summary, followed by a detailed description of the two HUSL models which served as manufacturing prototypes. The report concludes

with recommendations for future work, an appendix devoted to transducer problems peculiar to BDI, and a bibliography.

H486 1369
 Sonar doppler applications.
 Harvard Univ. - Underwater Sound Lab.
 Nov. 15, 1945 164p.

This report deals with all the devices for control, enhancement, or utilization of Doppler effect which were developed by the Sonar Division of the Harvard Underwater Sound Laboratory (HUSL). After the preface, which outlines the organization of the report, section I is devoted to the own-Doppler nullifier (ODN), a device designed to eliminate from the audio beat frequency of a sonar receiver the frequency change resulting from own-ship's motion. Section II is devoted to Doppler-controlled gain (DCG), a system whose function is to enhance selectively the intensity of echoes returned from moving targets. Section III contains the discussion of a parallel arrangement of filters designed to have high discriminatory sensitivity in response to Dopplerized signals. This system is called the electronic aural responder (EAR), because its performance is analogous to that of the human ear. Section IV describes the operation of the reverberation suppression filter (RSF), a band-elimination filter which attenuates nondopplerized echoes or reverberation, thereby enhancing the contrast of Dopplerized echoes. Section V covers a target-Doppler indicator (TDI), consisting of a frequency discriminator and an oscilloscope, on the screen of which the characteristics of a Dopplerized echo can be analyzed. Section VI is devoted to audible-Doppler enhancers (ADE), which operates by doubling or quadrupling the audible frequency shift in Dopplerized echoes. Finally, an appendix presents some

of the general principles and theoretical considerations involved in all of the Doppler-utilization devices. Each section of the report is devoted to a particular device and includes an historical summary of the work, a detailed description, and the conclusions and recommendations for future work. A bibliography is included.

H487

1370

Miscellaneous studies in electrical-transmission networks. Harvard Univ. - Underwater Sound Lab.
Nov. 15, 1945 69p.

This report collects several miscellaneous studies made in support of various apparatus-development projects undertaken by the Harvard Underwater Sound Laboratory (HUSL). The first section, on networks having linear phase shift, brings together some material scattered in the literature and presents new data concerning a bridged-T linear phase-shift circuit which is easy to construct. The first part of the report concludes with discussion of an unpublished method of producing two signals differing in phase by 90 deg. over a considerable frequency range. An extension of this method that seems capable of improving materially the accuracy of the quadrature phasing is proposed. The second part of the report deals with considerations in transformer design for ultrasonic frequencies.

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1371

Roster of all employees, Underwater Sound Laboratory, Harvard University, 1941 to 1946. Harvard Univ. - Underwater Sound Lab.
N.D. 51p.

This roster provides the name, classification, terminal dates of employment, and previous employment of each employee.

305/306
(Reverse Blank)

COLUMBIA UNIVERSITY -
DIVISION OF WAR RESEARCH,
PEARL HARBOR DIVISION

ACCESSION NUMBERS

P23/PHR17-1372

THROUGH

G34A/PHR91-1389-1391

P23/PHR17
COLE, A. R.

1372

Procedure for measuring sensitivity of 755 receiver-amplifier systems. Columbia Univ. - Div. of War Research, Pearl Harbor Div. Oct. 3, 1944 9p.

This memorandum describes the procedure used for measuring the sensitivity of the 755 receiver-amplifier on USS BESUGO (SS321) and USS SEA-FOX (SS402). The attached curve sheets, figures 1 to 6, inclusive, show the gain-control characteristics and calculated sensitivities of the amplifiers of these two submarines.

D50/PHR28

1373

Installation and maintenance procedures for electronic equipment no. 2, modification instructions for depth-charge direction indicators manufactured under Navy Department Contract NObs-13207. Columbia Univ. - Div. of War Research, Pearl Harbor Div. Oct. 30, 1944 29p.

These instructions cover the procedures and materials required for modification of the cable systems and NL-116 amplifier-indicators of the depth-charge direction indicators manufactured for the Navy Department, Bureau of Ships, by the F. W. Sickles Co. under contract NObs-13207. Drawings, photos, and diagrams are included.

G34A/PHR35

1374

Monthly report, October, 1944. Columbia Univ. - Div. of War Research, Pearl Harbor Div. Nov. 6, 1944 9p.

This monthly report discusses work progress on the depth-charge direction indicator and submarine noise measurements. Also included in this report is a list of

documents issued by the Pearl Harbor Division during October.

G34A/PHR53

1375

Monthly report, November 1944. Columbia Univ. - Div. of War Research, Pearl Harbor Div. Dec. 7, 1944 10p.

This monthly report discusses work progress on the depth-charge direction indicator, comparative tests of shipboard radio receivers, and tests of the torpedo-detector modification of USS CAIMAN. Included in this report is a list of documents issued by the Pearl Harbor Division during November.

G31/PHR55

1376

Installation instructions for the slip-ring modification to the QB projector-cable system of WCA-2 echo ranging-listening-sound equipment. Columbia Univ. - Div. of War Research, Pearl Harbor Div. Jan. 8, 1945 v.p.

These instructions describe the materials and procedures for the installation of the slip-ring modification to the QB projector-cable system of the WCA-2 equipment of a submarine. These instructions apply specifically to the modification of the QB gear as it exists on Electric Boat Co. 313-type submarines. Included are photos and drawings.

G31/PHR58

1377

ARNDT, W. F.

Overside JP listening equipment on USS RELIANCE (CG150). Columbia Univ. - Div. of War Research, Pearl Harbor Div. Dec. 26, 1944 6p.

This memorandum describes the overside JP listening equipment installed on USS RELIANCE (CG150). Overside JP gear on a surface vessel

was provided specifically to meet the needs of a test program for various projects necessitating the simulation of listening conditions from an enemy surface vessel engaged in A/S activities while laying to.

G42/PHR65 1378
ARNDT, W. F. and COLE, A. R.
Modification of QFF primary listening teacher for auditory testing.
Columbia Univ. - Div. of War Research, Pearl Harbor Div.
Jan. 17, 1945 11p.

This memorandum describes the electrical and mechanical modifications of the QFF primary listening teacher to adapt this equipment to the special requirements of the auditory-testing program for sonar operators. Included are photos, curves, and drawings. Two complete copies of this memorandum are attached.

G34A/PHR67 1379
Monthly report, December 1944.
Columbia Univ. - Div. of War Research, Pearl Harbor Div.
Jan. 5, 1945 7p.

This monthly report discusses work progress on submarine sound measurements and electrical and operating characteristics of RBY-1 radio receivers. Included is a list of documents issued by the Pearl Harbor Division during December.

G31/PHR69 1380
REISEL, E. L.
Installation of pulley and counterweight cable-control system for QC-JK equipment of USS BOARFISH (SS327).
Columbia Univ. - Div. of War Research, Pearl Harbor Div.
Jan. 12, 1945 v.p.

This memorandum describes the pulley and counterweight cable-

control system installed in conjunction with the QC-JK training gear of USS BOARFISH (SS327) as a means of improving the wrapping action of the projector cables. Included are photos and drawings.

G31/PHR70 1381
ARNDT, W. F.
Installation of the slip-ring modification to the QB projector cable system of USS BOARFISH (SS027).
Columbia Univ. - Div. of War Research, Pearl Harbor Div.
Jan. 10, 1945 4p.

This memorandum discusses the modification of the slip-ring assembly, which was intended to eliminate the hazards of cable failure inherent in the usual arrangement, involving direct connection of the cable to the rotating projector-tube head casting. The design of this modification followed the general lines of the slip-ring portion of the torpedo detector modification. Photos are included.

G31/PHR74 1382
REISEL, E. L.
Installation of slip-ring modification for topside QB equipment of USS TINOSA (SS283).
Columbia Univ. - Div. of War Research, Pearl Harbor Div.
Jan. 11, 1945 7p.

This memorandum describes the installation of a slip-ring modification on the topside QB equipment of USS TINOSA (SS283) and, thus, will serve as a guide for any similar installations that may be necessary in the future. This particular modification was intended to eliminate the hazards of cable failure inherent in the special arrangement on TINOSA, in which the end of the QB shaft was only 2-1/4 in. above one of the stowed torpedoes. Included are drawings and diagrams.

D56/PHR75

1383

ARNDT, W. F.

Sea trials of underwater-telephony system.
Columbia Univ. - Div. of War Research, Pearl Harbor Div.
Jan. 20, 1945 8p.

This memorandum describes sea trials of the underwater-telephony system carried out on 15 January 1945 by USS PIPER (SS409) and USS STERLET (SS392). This telephony system depends on voice modulation of a supersonic transmission, which is received by standard echo-ranging equipment. Ultimate range for fair two-way communication when both craft were surfaced was at least 13,300 yd. At a range of 10,700 yd, good communication was had to a depth of 400 ft under conditions of deep submergence by STERLET and periscope depth by PIPER. Two-way communication was obtained to at least 14,000 yd under conditions of periscope depth by PIPER. Four photos are included.

G42/PHR76

1384

SMITH, K. R. and THURLOW, W. R.

Preliminary entrance requirements for schools of the Training Command, Pacific Fleet.
Columbia Univ. - Div. of War Research, Pearl Harbor Div.
Jan. 25, 1945 5p.

Preliminary entrance requirements, in terms of Classification Test scores, have been determined for the following schools of the Training Command, Submarine Force, Pacific Fleet: Sonar School, Electrical (Main Control) School, Auxiliary School, and Radio School. The schools selected for the establishment of entrance standards are those where it is possible to train only a limited number of students and those where a reduction of the failure rate to the lowest possible value is important as a means of saving instruction time and effort. This

report discusses the procedure for establishing entrance requirements and the requirements that were established.

D56/PHR79

1385

ARNDT, W. F. and COLE, A. R.

Instructions for installation and operation of the underwater-telephony system.
Columbia Univ. - Div. of War Research, Pearl Harbor Div.
Feb. 14, 1945 12p.

These instructions describe both the installation and operation of the underwater-telephony system as it is used for voice communication between a surface vessel and a submarine. Full tactical observation and operational testing of the system are possible only when the equipment is installed in conning. If, however, this is not practicable, the equipment can be installed in the forward torpedo room. Several drawings are included.

G34A/PHR81

1386

Monthly report, January 1945.
Columbia Univ. - Div. of War Research, Pearl Harbor Div.
Feb. 6, 1945 11p.

This is the monthly report of the Pearl Harbor Division of Columbia University, Division of War Research, for the month of January, 1945. Submarine sound measurements, underwater telephony, an experimental speech inverter, and an echo simulator are among the subjects that are discussed. At the end of the report is a list of all documents issued by the Pearl Harbor Division during the month of January.

G31/PHR86

1387

RIGHT, R. R.

Steps in constructing dials for torpedo evasion when visually detected.

Columbia Univ. - Div. of War
Research, Pearl Harbor Div.
Mar. 3, 1945 6p.

Two sample dials have been produced, one with a black background and white figures and the other with a white background and black figures. These dials were made by a simple photographic process and can be produced in large quantities in a very short time. This report discusses the steps used in constructing the dials, including producing photographic prints, dry mounting, lacquering, framing, providing wooden backs, fitting, and maintenance. Two photos and a drawing are included.

G31/PHR87 1388
RICHT, R. R.

TDM maneuvering dial (slide rule dial).
Columbia Univ. - Div. of War
Research, Pearl Harbor Div.
Mar. 3, 1945 4p.

A sample dial has been constructed of simple design and inexpensive materials. The construction of the dial is such that it could easily be produced in quantities by existing facilities at the Submarine Base, Pearl Harbor. This report discusses techniques used to produce this dial, including: photography, dry mounting, trimming, edge blackening, lacquering, waxing, making and fitting pointers, and maintenance. Two photographs are included.

G34A/PHR91 1389
Monthly report, February 1945.
Columbia Univ. - Div. of War
Research, Pearl Harbor Div.
Mar. 9, 1945 7p.

This is the monthly report of the Pearl Harbor Division of Columbia University, Division of War Research, for the month of

February, 1945. At the end of this report is a list of all documents issued by the Pearl Harbor Division during the month of February. The following subjects were discussed: submarine-sound measuring facilities, underwater telephony, maneuvering dials for use with torpedo-detector modification, sea trials of NAE beacons and MK II grenades, and general engineering activities.

D56/PHR93 1390
RODGER, M. T. and COLE, A. R.
Single side band underwater-telephony adapter for WCA, WCA-1, -2 equipments.
Columbia Univ. - Div. of War
Research, Pearl Harbor Div.
Mar. 20, 1945 6p.

A relatively small portable underwater-telephony adapter unit that can be temporarily installed in the conning tower of any submarine equipped with the WCA, WCA-1, or WCA-2 sonar equipments has been constructed. This unit provides direct two-way voice communication between submarines, or a submarine and an escort ship. The portable underwater-telephony adapter was sea-tested on USS LIONFISH. The New London CUUWR underwater telephony was installed on board USS PRUITT (DM22). Satisfactory two-way voice communication was maintained at all ranges up to and including 7500 yd, with the LIONFISH operating underway at periscope depth and the PRUITT operating underway at approximately 8 to 11 knots. The underwater-telephony adapter is described and its present status is discussed. A drawing is included.

G34A/PHR35-1374-PHR91-1389

1391

Monthly Reports.

Columbia Univ. - Div. of War
Research, Pearl Harbor Div.

Nov. 6, 1944 to Mar. 9, 1945 5 reports.

The following are monthly reports of projects conducted at Columbia
University - Division of War Research, Pearl Harbor Division, from October
1944 through February 1945:

<u>Report Number</u>	<u>Period Covered</u>	<u>Report Date</u>
G34A/PHR35-1374	Oct., 1944	Nov. 6, 1944
G34A/PHR53-1375	Nov., 1944	Dec. 7, 1944
G34A/PHR67-1379	Dec., 1944	Jan. 5, 1945
G34A/PHR81-1386	Jan., 1945	Feb. 6, 1945
G34A/PHR91-1389	Feb., 1945	Mar. 6, 1945

SUBJECT INDEX

Above-Below Indicator
D50/R1245-1014

Acoustic Locating Systems
H421-1346

Acoustic Marine Speedometer
H471-1358
H263-1291

Acoustic Training
H97-1221

Acoustic Calibrations
P34/R1244-1013

Acoustic Measurements
P34/R860-676
P34/R1244-1013

Acoustic Properties of Water
G1/R483-344

Acoustic Tests
P20/R607-448

Adapter Flange - COG-51053
D24/R696-534

Afterbody
G2/R231-114

Airplane Detection
P33/R890-699-5
P33/R897-704
P33/R1149-924

Airplane Noise
D16/D34/R107-005
P33/R988-779

Airplane-Noise Survey
D46A/R470-331
D46A/R532-383
D46A/R863-678

Ambient-Noise Survey
D46/R1215-984

Amplidyne Motor Generators
D55/R1027-810
D55/R1150-925

Amplifier Measurements
P35/R870-684

Amplifiers
G12/D12E/R216-100
P35/R345-217
D24/R347-219
G30/R569-416
P35/R653-494
D53.2/P42/R785-608
D54/R854-670
P60/R1387-1151

Amplifiers -- 755-B
P44/R865-679

Amplifiers -- 12250-AE
G27/R351-223

Amplifiers -- 12258-BE
D44/R302-178

Amplifiers -- 12277-CE
D24/R346-218
D24/R373-243

Amplifiers -- 12933 BE
D24/R343-215

Amplifiers -- 12950 BE
D46A/R370-240

Amplifiers -- Audio
D56/R953-750

Amplifiers -- CDI-50140
D24/R615-456

Amplifiers -- Echo-Doppler
P36/R881-695

Amplifiers -- ES0-54081
D56/R775-599

Amplifiers -- Internal-Communications
Systems
D54/R792-614

Amplifiers -- JP
D24/R598-445
D24/R618-459
D24/R629-470
D24/R652-493
D24/R658-499
D24/R784-607

Amplifiers -- JQ
P-35/R418-284
D24/D38/R585-432

Amplifiers -- NL-102
D22/D24/R153-050
D24/D38/R162-057
D24/R621-462

Amplifiers -- NL-105
D22/D24/R153-050
G30/R213-098
D24/D38/R217-101
G12/G7/R447-311
D24/R720-549
D24/R783-606
D24/R819-640

Amplifiers -- NL-115
D24/R625-465

Amplifiers -- NL-116
D50/PHR28-1373

Amplifiers -- NL-117
D24/R808-629
D24/R848-664
D24/R1238-1007

Amplifiers -- NL-118A
D55/R963-759

Amplifiers -- QFL Tactical Range-
Recorder Teacher
P21/R769-594

Amplifiers -- Sonic
D24/R694-532

Amplifiers -- Volume-Compression
D54/R1072-854

Amplitude Detectors
P35/R1255-1024

AN/ARR-3
D16/R471-332
D16/R1219-988

AN/CRT-1 Units
D16/R306-182
D16/R311-187
D16/R365-236
D16/R376-246
D16/R381-252

AN/CRT-1 Units (cont.)
D16/R400-268
D16/R471-332
D16/R660-500
D16/R976-768

AN/CRT-1A Units
D16/R886-699
D16/R898-705
D16/R912-712
D16/R1158-933
D16/R1194-963
D16/R1208-977
D16/R1324-1088
D16/R1375-1140

AN/CRT-1B Units
D16/R1208-977

Anchored-Vessel Screening
D44/R516-370
H424-1347

Animated Trainers -- ISWAS
P47/R1108-884
P47/R1194-962
R1000-791

Annealizing -- Nickel-Tubing
See also: Heat Treatment of Nickel

Annealizing -- Nickel-Tubing
D16/R440-305
G12/R928-726
D16/R1103-880
D34/R1241-1010

Antenna -- TBS
D16/R686-524

Anti-Submarine Attack Aids
D19/R1205-974

Anti-Submarine Attack Plotter (ASAP)
D26/R584-431
D26/R1350-1114

Anti-Submarine Projectiles
D28/R140-038

Anti-Submarine Training Maneuvers
D16/R388-259

Anti-Submarine Warfare

G20/R124-025

A3/R402-269

Artificial Sound Source

P63/R1374-1139

Artificial Underwater-Sound Source

G13/R429-294

ATT

See: Automatic Target Training

Attack Aids Adapter

D26/R584-431

Attack Computers

D26/R309-185

Attack Directors

F 5/R1350-1114

H287-1302

H469-1356

H476-1363

Attack Plotters -- G.E.

D35/R254-134

Attack Plotters -- Mechanical

Geographic

H295-1306

H320-1313

Attack Teacher

P40/P52/R955-752

P40/R1354-1118

P40/R1361-A-1126

P48/R1399-1162

Attenuators -- Motor-Driven,

Cam-Operated Variable

P37/R1393-1157

Attenuators - Variable (BDI)

H278-1297

Audible-Doppler Enhancer

H90-1219

H96-1220

H97-1221

H165-1259

H486-1369

Automatic Target Training (ATT)

D51/R635-476

H97-1221

H123-1240

H133-1247

H136-1249

H165-1259

H472-1359

Automatic Volume Control

D20/R259-139

H464-1354

Background Noise

See also: Water Background Noise

Background Noise Measurements

G1/R479-340

P42/R650-491

P33/R1317-1081

Baffle Adapters -- Model NL-111

D24/R276-155

Baffle Adapters -- Model NL-112

D38/R283-161

D38/R674-514

Baffle Adapters -- Model NL-114

D22/R291-167

Baffle Blanket

D24/R1102-879

Baffles -- COG-51053

D24/R697-535

Baffles -- DRSB Hydrophone

D34/R738-565

D34/R1225-994

Baffles -- Hydrophone

D24/R948-745

D55/R972-765

D55/R1130-905

Baffles -- JP

G12/R805-626

D24/R827-648

Baffles -- Streamlined

G12/R1327-1091

Baffles -- Topside Straight
Hydrophones
G12/R1010-795

Bathymograph Observations
H200-1268

Bathymographs
G1/R421-287

Batteries
D16/R189-079
D16/D34/R462-324

Battery Harness -- ERSB
D16/R218-102

Battery Holders -- AN/CRT-1
D16/R305-181

BDI
See: Bearing-Deviation Indicator

Bearing-Calibrator Noise Source
D55/R1256-1025

Bearing-Deviation Indicator
D51/R765-590
D51/R823-644
D51/D55/R845-661
D51/R974-767
H143 A-1254
H147-1256
H175-1261
H176-1262
H247-1287
H271-1295
H375-1333
H378-1334
H420-1345
H485-1368

Bearing-Deviation Indicator --
Alignment
H278-1297

Bearing-Deviation Indicator -- Dynamic
Demonstrator
H279-1298
H375-1333
H415-1344
H462-1353

Bearing-Deviation Indicator --
Evaluation
H253-1288

Bearing-Deviation Indicator -- Signal
Generator
H401-1340
H409-1342

Bearing-Deviation Indicator (SLC) Unit
H106a-1227

Bearing-Deviation Indicator - Texts
H292-1304

Bearing-Deviation Indicator --
Training Aids
H219-1275
H246-1286
H324-1314

Bearing-Deviation Indicator --
Variable Attenuator
H278-1297

Bearing Howl
D53/R1091-868

Bearing Indicator
See: Range and Bearing Indication

Bearing-Indicator Animated Trainer
P47-R937-735
P47/R982-774

Bearing Recorder
See: Recorders -- Range and Bearing

Bearing-Repeater System -- NL-127
D55/R971-764

Beeper Equipment
H421-1346

Binaural Listening System
P12/R145-042

Blastphones
D50/R692-530
G12/R853-669
D50/R930-728

Blimps -- Flare Gun
D36/R146-043

Block Island Cable System
D12A/R1118-894

Block Island Listening Station
D12/R856-672

Bomb Racks -- Mk II

D20/R379-250

D20/R386-257

D20/R404-271

D20/D40/R419-285

D20/D40/R420-286

Bomb Racks -- Mk 53

D23/R380-251

Bomb-Release Latch

D23/R135-033

Bombs -- Detonating Devices

P62/R1190-958

BP Line Filter

D50/R957-754

Bridge Measurements

P35/R870-684

P35/R1304-1068

British Markers

D21/R951-748

Broadband Source

G1/R1196-965

Buoy Field Engineer

D16/R489-349

D16/R490-350

Buoy-Launching Tests

D16/R506-362

Buoy-Launching Tube

D16/R502-358

Buoys

D16/R266-145

D16/R267-146

Bursting Units

D49/R725-554

Cables -- Nonloaded

D12/R334-206

Calibration -- Baffles

G12/R428-293

Cathode-Ray Tube

D57/R1287-1054

Cavitation Indicator

P55/R1065-848

P55/R1080-860

P55/R1090-867

P55/R1191-959

P55/R1191A-960

P55/R1192-961

P55/R1203-972

P55/R1341-1105

P55/R1424-1186

Chart Recorder

See: Recorders -- Portable Polar Chart

Chemical Recorder Range Scale

D20/R451-314

Chemical Recorders

D41/R174-069

D26/R206-091

D41/D26/R222-106

D20/R265-144

D26/R541-391

P65/R1345-1109

Circuits -- NL-106

D38/R342-214

Circuits -- NL-107

D38/R341-213

Commutated Rotation Sonar

H132-1246

Computers

See: Attack Computers

Condensers

D22/D24/R153-050

Condensers -- Magnetic Compass

D16/R293-169

Conning Officer Attack Teacher -- Mk I

P40/R1227-995

Conning Officer Attack Trainer

P40/R1147-922

P40/R1156-931

Converters -- EL-510

D24/R720-549

Course-Change Simulator

P63/R1339-1103

Crash Dive Tests
P34/R993-784

Crystal Resonance Frequency
H54-1206

Cabinets
D24/R698-536

Cables
See also: Block Island Cable System

DCG
See: Doppler-Controlled Gain

Dead-Reckoning Analyzer Indicator
A30/R1120-896

Deep Submarine Attacks
H360-1325

Depth-Angle Measurement
G17/R139-037

Depth-Angle Sound Projector
G17/G2/R434-299

Depth-Charge Direction Indicator
D50/R614-455
D50/R665A-505
D50/R668-508
D50/R830-652
D50/R858-682
D50/R873-687
D50/R987-778
D50/R1049-832
D50/R1146-921
D49A/R1313-1077
D50/R1355-1119
D50/PHR28-1373
G34A/PHR35-1374
G34A/PHR53-1375

Depth-Charge Indicator
D50/P19/R436-301
G12/R570-417

Depth-Charge Intervalometers
D28/R981-773
D28/R1364-1129

Depth-Charge Range Estimator
D50/R1337-1101
D50/R1382-1146

Depth Charge Range Estimator (cont.)
D50/R1390-1154
D50/R1391-1155
D50/R1394-1158
D50/R1398-1161

Depth-Charge Range Indicators
D50/R1026-809

Depth Charge Range Meter
D50/R910-710
D50/R1222-991
D50/R1252-1021
D50/R1285-1052

Depth Charges
G10/G15/R202-088

Depth Charges -- Fast-Sinking
P17/R1328-1092
D10/D29/R1351-1115
D28/R1363-1128

Depth Charges -- Mk 12
D10/R740-567

Detection Ranges
P29/R793-615
P33/R1123-899

Detonators -- Electric
P17/R194-082

Direction Indicators
D50/R987-778

Directional
G10/G15/R202-088

DKSB
See: Directional Radio Sonobuoys

Directional Radio Sonobuoys
D34/R292-168
D34/R414-280
D34/R515-369
D34/R553-402
D34/R632-473
D34/R747-573
D34/R774-598
D34/R791-612
D16/R835-654
D34/R851-667
D16/D34/R943-740
D34/R990-781

Directional Radio Sonobuoys (cont.)

P52/R1037-820
P52/R1041-824
D34/R1083-863
D34/R1141-916
P52/R1142-917
D34/R1162-937
D34/R1169-944
D34/R1200-969
D34/R1234-1003
D34/R1239-1008
D34/R1260-1029
D34/R1286-1053
D16/R1388-1152
D34/R1411-1174

Directional Radio Sonobuoys --
Baffles

D34/R1097-874

Directional Radio Sonobuoys --
Comparison Test

D34/R911-711

Directional Radio Sonobuoys --
Compass Capacitor Checker

D34/R1275-1043
P63-R1308-1072

Directional Radio Sonobuoys --
Drop Tests

D34/R1071-853
D34/R1180-948
D34/R1188-956
D34/R1198-967
D34/R1210-979
D34/R1217-986

Directional Radio Sonobuoys --
Mechanical Deficiencies

D34/R1370-1135

Directional Radio Sonobuoys --
Plotting Boards

D34/R1392-1156

Directional Radio Sonobuoys --
Power Supplies

D34/R1032-815

Directional Radio Sonobuoys -- Receivers

D43/R682-520
D34/R879-693
D34/R1064-847

Directional Radio Sonobuoys -Trainers

P52/R945-742
P52/R1212-981
P52/R1335-1099

Directional Radio Sonobuoys -- Training
Records

P52/R1423-1185

Directivity Patterns

H64-1208
H65-1209

Distortion Tests

P35/R712-542

Dockside Noise Measurement

D53/R874-688

Document Lists

G8/R384-255
G8/R397-266
G22/R875-689
G8/R1292-1057

Doppler-Controlled Gain (DCG)

H486-1369

Doppler Indicators

H114-1233
H97-1221

Doppler Nullifier

See: Own-Doppler Nullifier

Doppler-Sensitive Equipment

H314-1312

Drag Measurements

G2/R230-113

Drivers -- Dual Frequency

H330-1316
H440-1351

DRT -- Plotting Device

H131-1245

Dual-Listening System

See: Listening Systems -- Dual

Dynamic Monitors

H343-1321
H412-1343

Dynamotors

D38/R576-423

Echo-Doppler Amplifier

P36/R908-709

Echo-Doppler Indicator

P36/R504-360

P36/R881-695

P36/R908-709

P36/R935-733

P36/R1262-1031

Echo-Pulse Generator

P40/R1354-1118

Echo-Ranging

G10/R731-560

P29/R793-615

H30-1200

H41 & H56-1203

H102-1223

Echo-Ranging Booster

H165-1259

H212-1271

H212b-1272

H230-1280

Echo-Ranging -- Cobar

D44/R424-289

Echo-Ranging Conditions

G1/R437-302

Echo-Ranging Conversion Unit

H165-1259

Echo-Ranging Equipment

See also: Figure of Merit - Echo-Ranging Equipment

Echo-Ranging Equipment

D20/R120-021

D20/R312-188

D40/R326-201

D45/R331-204

D20/R338-209

D43/D20/R392-263

D20/D43/R399-267

D44/R424-289

D20/R425-290

P29/A24A/R520-374

D20/R548-398

D40/R562-409

Echo-Ranging Equipment (cont.)

D40/R563-410

D40/R564-411

D51/R593-440

D24/R609-450

D51/R623-464

D24/R646-487

P29/R1076-857

D57/R1201-970

D20/R1376-1141

D16/R1388-1152

H117-1235

H343-1321

H412-1343

Echo-Ranging Equipment -- Mk II

D20/R451-314

D20/R452-315

Echo-Ranging Equipment -- Modified Receiving Stack

D20/R103-002

D20/R104-003

Echo-Ranging Equipment -- MTB

D40/R406-272

Echo-Ranging Equipment -- QC Type

P29/A24A/R531-382

H10-1197

H15-1198

H35-1201

H50-1205

H70-1210

H87-1218

H90-1219

Echo-Ranging Rack

D20/R548-398

Echo-Ranging Tests

P29/R789-611

Echo-Repeater Calibrators

H470-1357

Echo-Repeater Target

G37/A24A/R545-395

G37/A24A/R546-396

Echo Repeaters

G29/R355-227

D40/R406-272

H341-1319

H475-1362

Echo Repeaters -- Whale
H305-1310

Echo-Repeating Gear
H284-1301

Echo Simulators
G34A/PHR81-1386

Electric-Light Markers
D16/R1375-1140

Electric Torpedo -- Mk XX
P33/R1347-1111

Electrical Noise
D24/D38/R726-555

Electrical Range Solver
D51/R1343-1107

Electrical-Transmission Networks
H487-1370

Electromagnetic Waves
G10/R1028-811
G10/R1057-840
G10/R1058-841

Electro-Mechanical Analogs
H150-1257

Electronic Aural Responder (EAR)
H486-1369

Electronic Automatic Search
H362-1327

Electronic Design
P35/R1428-1189

Electronic Variable-Interval Timer
D23/R132-031

Equalizer Design
P37/R1278-1046

Equipment Demonstrations
H314-1312

ERSB

See: Expendable Radio Sonobuoys

Expendable Radio Sonobuoys

D16/R122-023
D16/R136-034
D16/R147-044
D16/R149-046
D16/R156-053
D16/R160-054
D16/R182-075
D16/R188-078
D16/G10/R196-084
D16/R207-092
D16/R237-120
D16/R243-126
D16/R250-131
D16/R268-148
D16/R272-151
D34/R275-154
D16/R282-160
D16/R293-169
D16/R297-173
D16/R318-193
D16/R320-195
D16/R362-234
D16/R365-236
D16/R377-247
D34/R378-249
D16/R381-252
D16/R389-260
D16/R400-268
D16/R426-291
D16/R431-296
D16/R542-392
D16/R572-419
D16/R578-425
D16/R660-500
D16/R681-519
D16/R764-589
D16/R768-593
D16/R811-632
D16/R818-639
D16/R821-642
D16/R832-649
D16/R829-651
D16/R886-699
D16/R920-721
D16/D34/R943-740
D21/R951-748
D16/R976-768
D34/R1019-803
P52/R1029-812
D16/R1035-818
D16/R1082-862
D16/R1084-864
P52/R1142-917
D16/R1164-939
D16/R1280-1048

Expendable Radio Sonobuoys -
Bomb Case
D16/R164-059

Expendable Radio Sonobuoys -
Drop Tests
D16/R907-708
D16/R1186-954

Expendable Radio Sonobuoys -
Echo Ranging
D16/R1368-1133

Expendable Radio Sonobuoys - Field -
Strength Meters
D16/R756-581

Expendable Radio Sonobuoys - Flashing Lights
D16/R106-004

Expendable Radio Sonobuoys -
Headphones
D16/R152-044

Expendable Radio Sono Buoy -
Hydrophones
D16/R315-191
D16/R433-298
D16/R472-333
D16/R473-334
D16/R496-354
D16/R525-377
D16/R536-387
D16/R537-388
D16/R555-404
D16/R612-453
D16/R685-523
D16/R689-527
D16/R734-563

Expendable Radio Sonobuoys -
Markers
D21/R465-327

Expendable Radio Sonobuoys -
Modifications
D16/R1344-1108

Expendable Radio Sonobuoys -
Operators
P23/R521-375

Expendable Radio Sonobuoys -
Paracutes
D16/R994-785
D16/R1025-808
D16/R1044-827

Expendable Radio Sonobuoys -
Radar Sea Markers
D16/R503-359

Expendable Radio Sonobuoys -
Receiver-Recorders
D16/R1280-1048

Expendable Radio Sonobuoys -- Receivers
D34/R682-520
D16/R687-525

Expendable Radio Sonobuoys -- Search Tests
D16/R438-303

Expendable Radio Sonobuoys -- Soluble
Inserts
D16/R143-040

Expendable Radio Sonobuoys --
Tests
D16/R234-117
D16/R268-147
D16/R270-149
D16/R466-328
D16/R1145-920

Expendable Radio Sonobuoys --
Training
D16/R209-094
D16/R210-095
D16/R211-096
D16/R297-173

Expendable Radio Sonobuoys--
Transmitters
D34/R137-035

Extended-Range Monitor
H270-1294

Field Recording
P37/R1299-1064

Field-Strength Meter
D16/R681-519

Filter Design
P35/R984-776

Fire Control
D24/R169-065
H302(2)-1309

Fittings
D50/R730-559

Flares - Mk V
D21/R285-162

Flares -- Underwater
D31/R116-017
D31/R127-027
D31/R240-123

Float Lights
D21/R220-104
D21/R228-111
D21/R649-490
D21/R1232-1001

Fluid Gyroscopes
D42/R651-492
P38/R1318-1082

Force-Measuring Devices -
Copper Balls
P18/R274-153

Frequency-Dividing Network
G13/R1305-1069

Frequency Translation
P33/R988-779

Front-to-Back Discrimination
G12/R743-570

Fuze Program
D10/D29/R111-009
D10/R118/019

Fuzes
D10/R257-137

Fuzes -- 6-40-C
D23/R255-135
D10/D29/R289-163

Fuzes -- 7-40-M
D29/R163-058
D29/R172-067
D29/R178-072
D29/R224-107

Fuzes -- 7-40-M (cont.)
D29/R235-118
D23/R255-135
D29/R256-136
D10/D29/R287-163

Fuzes -- Depth Charges
P17/R1328-1092

Fuzes -- Echo-Ranging
G20/R741-568

Fuzes -- Projectile
D10/R108-006

Fuzes -- R-Type
D48/R1189-957

Fuzes -- Water Seals
D23/R244-127

Gain Measurements
P35/R669-509

Generated-Target Tracking -- JT
D55/R1348-1112
D55/R1349-1113

Ground-Reflection Coefficients
R115.5-016

Ground-Speed Indicator
G10/R226-109

Gun-Train Indicator
D42/R200-086
D42/R251-132
D42/R299-175
D42/R308-184
D42/R359-231
D42/R409-275
P38/R880-694

Harbor Surveys
D12/R109-007
D12/R119-020
D12/R173-068
D12/R215-099
D12/R307-183
D12/R352-224
D12/R453-316

Harvard -- NDRC Underwater-
Sound Program
H3-1196

Headphones

D16/R513-368
D16/R630-471
G12/R631-472

Headphones -- Permoflex

D24/D38/R301/177
G271/699-2
G27/R952-749

Heat Treatment of Nickel

See also: Annealization -
Nickel Tubing

Heat Treatment of Nickel

D16/R468-330
D16/R497-355
D34/D16/R523-376
G12/R530-381
D16/R748-574
D16/R831-653

Hemispherical Parachute

G2/R229-112

Heterodyne Meter-- Indicating Bridge Detector

P35/R1381-1145

High-Frequency Bridge Detector

P35/R1381-1145

Hipersil Cores

P35/R871-685
P35/R1012-797

Hydrophone Baffles

See: Baffles -- Hydrophones

Hydrophone Design

G12/R733-562
G12/R746-572

Hydrophone Directionality

P48/R934-732

Hydrophone Patterns

G12/R1301-1065

Hydrophone Preamplifiers

P35/R679-518

Hydrophone Systems

D12B/R115-015

Hydrophones

G12/R101-000
G12/R166-061
D16/R167-062
D12/R350-222
D24/R441-306
G12/R488-348
G12/R779-602
P34/R788-610
G13/R859-675
D53/R1155-930
H37-1202

Hydrophones -- AN/CRT-1

D16/R592-439

Hydrophones -- Annealization-Testing

G12/R754-579

Hydrophones -- AX-48

G12/R439-304

Hydrophones -- AX-50

G12/R408-274
D16/R422-288
G12/R583-430

Hydrophones -- AX-58

G27/R353-225
G27/R356-228
G12/R357-229
G12/R554-403
G12/R709-539

Hydrophones -- AX-120

G12/R959-756
G12/R1168-943
G12/R1408-1171
G12/R1419-1182

Hydrophones -- BDI

G12/R797-619

Hydrophones -- Blimp-Towed

D25/R1240-1009

Hydrophones -- C-37

D12B/R294-170

Hydrophones -- C-43

D16/R261-141

Hydrophones -- Cable-Connected

D12/R1213-982

Hydrophones -- Calibration

G12/R428-293
G12/G7/R447-311
D53/R1271-1040

Hydrophones -- Crystal

D24/D38/R150-047
G1/R151-048
G12/R236-119
G12/R459-321
G12/R579-426
G12/R619-460
G12/914-714
G12/R1417-1180

Hydrophones -- Cylindrical

G2/R295-171
D34/R1007-792

Hydrophones -- D16 Mk IV E

D16/R800-622

Hydrophones -- Delobed

G12/R1254-1023

Hydrophones -- Design

D51/R1242-1011

Hydrophones -- Directional

Radio Sonobuoys

D34/R330-203
D34/R336-208
D34/R349-221
D34/R372-242
D34/R375-245
G12/R925-724
D34/R1097-874
D34/R1184-952
D34/R1223-992

Hydrophones -- Directivity

G12/R450-313
G12/R1218-987

Hydrophones -- Expendable

Radio Sonobuoys

See: Expendable Radio Sonobuoys --
Hydrophones

Hydrophones -- H-115

G12/R929-727

Hydrophones -- JP

D24/R539-389
G12/R581-428

Hydrophones -- JP (cont.)

G12/R597-444
G12/R620-461
D24/R628-469
G12/R643-484
G12/R664-504
D24/R732-561
G12/R753-578
D24/R761-586
D38/R1039-822
P33/R1047-830
P33/R1161-936
D24/R1243-1012

Hydrophones -- M-7/CRT-1A

D16/R798-620
D16/R799-621
D16/R801-623
D16/R802-624
D16/R1101-878
D16/R1104-881
D16/R1105-882
D16/R1224-993

Hydrophones -- Magnetization

G12/R691-529
D24/G12/R727-556

Hydrophones -- Magnetizers

D34/R1181-949

Hydrophones -- Magnetostriction

G27/R130-029
G27/R131-030
D16/R141-039
G1/R151-048
G12/R158-055
D16/R161-056
D38/D24/R203-089
D16/R280-159
D16/R385-256
D17/R543-393
D16/R555-404
D16/R557-405
D16/R654-495
D16/R677-517
G12/R742-569
G12/R804-625
D34/R847-663
G12/R852-668
G12/R858-674
G12/R889-699-4

Hydrophones -- Magnetostriction (cont.)

G12/R915-715
P33/R949-746
G12/R1137-912
D34/R1181-949
G12/R1342-1106
G13/R1352-1116
G12/R1248-1017

Hydrophones -- Mk IV

D16/R440-305
D16/R467-329
D16/R578-425

Hydrophones -- Measurements

G12/R683-521

Hydrophones -- NL-124

D55/R966-761
G12/R1284-1051
G12/R1373-1138

Hydrophones -- NL-130

D50/P55/R1051-834
P55/R1099-876
D50/R1110-886
G12/R1373-1138

Hydrophones -- Painting

D24/R633-474

Hydrophones -- Performance

Characteristics
G12/R708-538

Hydrophones -- Piezoelectric

G27/R130-029

Hydrophones -- Spherical

G12/R925-724

Hydrophones -- Straight

Toroidally-Wound

D34/R477-338
D16/R610-451
G12/R804-625
D34/R847-663

Hydrophones -- Straight Wood Core

D50/P19/R436-301
G12/R547-397

Hydrophones -- Tests

G12/R1092-869

Hydrophones -- TM S97

G12/R1125-900

Hydrostatically Detonated Exploder

P62/R1358-1122

Impedance Bridge

G30/R535-386

Impedance Measurement

H141-1251

Impulse Excitation

D44/R340-211

Indicator-Amplifier-
Control Units

D20/R168-063
D20/R179-073
D20/R204-090
D20/R313-189
D20/R337-198
D43/D20/R392-263
D20/R425-290

Indicators -- Echo-Doppler

See: Echo Doppler Indicators

Indicators

See also: Above-Below Indicator
Gun-Train Indicator

Inductance Bridge

P34/R855-671

Inductive Echo Simulator

H145-1255

Insulating Materials

G21/R942-739

Intercommunication Amplifier

P42/R770-595

Intercommunication Systems

P42/R759-584
P42/R796-618
D54/R992-783

Interim Submarine-Listening System

D24/R586-433
D24/R615-456

Internal-Communication System
See also: Amplifiers -- Internal-Communication Systems

Internal-Communication System
D54/R806-627
D54/R933-731
D54/R1290-1056

Interphone Set -- NL-119
D24/R921-722

Interval Tests
D13/R249-130

Intervalometers
D28/R383-254
D28/R985-777

Ionosphere Characteristics
R112.54-011

Ionosphere Data
R112.54-012

ISWAS
See: Animated Trainers, ISWAS

JAA Training System
See: Training Systems, JAA

Japanese Documents
G1/R1060-843

JK Equipment
P55/R1115-891

JP Demonstration Records
P50/R1096-873

JP Equipment
See: Amplifiers -- JP

JP Listening Equipment
G31/PHR 58-1377

JP -- Overside Equipment
D22/D38/R1310-1074

JP Training Gear
D24/R550-399
D50/R919-720
D53/R1206-975

JP-1 Equipment
D53/R866-680
D24/R941-738
P32/R946-743
D24/R948-745
P55/R1115-891

JP-1 Operator Training
D24/R815-636
P50/R1197-966

Junction Box
D50/R693-531
P55/R1087-866
P55/R1228-996

Land Noise
D16/R1344-1108

Lateral Recording
P37/R1312-1076

Lead-Angle Computer
H227-1278

Libraries
See: Record Library

Line Filters
See: BP Line Filters

Listening Equipment
D51/R623-464
P20/R977-769

Listening Frequency Band
G12/R456-319

Listening -- QB Transducers
P32/R999-790

Listening -- Ranging Systems
D51/R571-418
D51/R622-463

Listening Studies
P33/R1409-1172

Listening Systems
See also: Binaural Listening Systems

Listening Systems -- Dual
D51/R519-373

Listening Systems -- JQ
D22/D24/D38/R435-300
D22/D24/D38/R455-318

Listening Techniques
G1/R242-125
G1/R288-164

Listening Tests
G1/R113-014
G1/R138-036
D17/R304-180
D34/R348-220
D34/R349-221
D16/R362-234
D17/R367-237
D34/R372-242
D34/R375-245
D24/D38/R391-262
G1/R407-273
D22/D24/D38/R455-318
G1/R494-352
D12C/R512-367
D34/R515-369
G27/R952-749

Live Missions
D16/R403-270

Lloyd-Mirror Effect
G1/R1196-965

Loudspeaker Frequency--
Response Measurement
P50/R1157-932

Loudspeakers -- RCA
D24/R252-133
P42/R722-551

Loudspeakers -- Submarine Signal
D24/R252-133

MAD Submarine-Search Test
D16/R438-303

Magic-Eye Indicator Mount
P55/R1094-871

Magnetic Properties -- 45 Permalloy
H264-1292

Magnetic Properties -- Nickel
H234-1281

Magnetostrictive
See: Hydrophones -- Magnetostrictive
Transducers -- Magnetostrictive

Maintenance of True Bearing
D20/D40/D45/R448-312
D20/R760-585

Maintenance of True Bearing Conversions
D40/R551-400
D40/R561-408
D40/R562-409
D40/R563-410
D40/R564-411
D40/D54/R594-441
D40/R627-467
D40/R627A-468

Maintenance of True Bearing
Revisions
D20/D40/R595-442
D20/D40/R611-452

Mark II D20 Rack
D20/R460-322

Mechanical Geographic Attack
Plotters
See: Attack Plotters, Mechanical Geographic

Merchant-Vessel Protection Program
P20/R387-258
P20/R501-357
P20/R559-406
P20/R606-506
P20/R688-526
P20/R1050-833
P20/R1216-985

Miami Ambient-Noise Survey
D46A/R358-230
D46A/R370-240
D46A/R860-678

Mine Location
D41/R495-353

Mixers -- Frequency-Conversion
Circuits
P35/R980-772

Modified Receiving Stack

D20/R102-001

D20/R103-002

Modulation Records

H405-1341

Monitors -- High-Frequency

H177.1-1264

MR Sonar

H238-1283

Mousetrap

D41/R412-278

MTB

See: Maintenance of True Bearing

MUF

R112.54-013

Nickel

See: Magnetic Properties -- Nickel

Nickel Tubing

G12/R1230-999

Night Lighting

P43/R857-673

Noise

See: Sound

Noise Generators

D51/R979-771

D55/R1256-1025

P35/A31/R1266-1035

Noise-Level Monitor

D35/R882-696

D53/R888-699-3

P55/R1052-835

P55/R1056-839

P55/R1062-845

P55/R1066-849

P55/R1079-859

P55/R1080-860

P55/R1153-928

P55/R1191-959

P55/R1191A-960

P55/R1192-961

P55/R1220-989

P55/R1281-1049

P55/R1323-1087

Noise-Level Monitor (cont.)

P55/R1341-1105

P55/R1424-1186

Noise-Level Monitor Adapter

P55/R1132-907

Noise-Level Monitor Trainer

P55/R1425-1187

Noise Measurement

See also: Airplane-Noise Survey

Ambient-Noise Survey

Background-Noise Measurements

Overside-Noise Measurement

Propeller-Noise -- Measurements

Submarine-Noise Measurement

Water-Noise Measurements

Noise Measurement

D38/R390-261

D38/R410-276

D21/R463-325

P20/R607-448

G13/R613-454

P42/R661-501

P42/R758-583

D53/R810-631

D53/R846-662

D53/R895-702

D53/R926-725

P32/R946-743

P20/R1022-805

P33/R1023-806

D53/R1034-817

P33/R1047-830

P55/R1052-835

D53/R1055-838

P55/R1056-839

D53/R1151-926

D53/R1207-976

H163-1258

Noise Reduction

D53/R1042-825

D53/R1307-1071

Noise-Reduction Programs

D53/R1059-842

Noise Sources

P34/R1276-1044

Noise Tests

P32/P33/R812-633

P55/R1220-989

OAX Sound-Gear Monitors

H307-1311

OAY Sound-Measuring Equipment

G7/R478-339

P35/R640-481

D53/R850-666

D53/R1249-1018

D53/R1258-1027

OAY Sound Meters

D53/R1271-1040

Oceanographic Stations

P28/R1231-1000

Oceanographic Studies

P28/R1214-983

Oceanographic Surveys

P28/R485-345

Odographs

D16/R190-080

D16/R272-151

H131-1245

Operating Manuals

G1/R117-018

D24/R122-023

D24/R123-024

D16/R144-041

D16/R147-044

D16/R148-045

D24/R233-116

D24/R359-231

D24/R417-283

D20/D40/R419-285

D20/D40/R420-286

D16/R572-419

D24/R573-420

D26/R584-431

D40/D45/R594-441

D40/D45/R595-442

D20/D40/R611-452

D50/R614-455

D24/R626-466

D40/R627-467

Operating Manuals (cont.)

D40/R627A-468

G37/R877-691

P36/R881-695

P36/R908-709

D16/R912-712

P47/R936-734

P47/R937-735

P58/R950-747

A30/R978-770

D28/R981-773

D34/R1167-942

P55/R1191-959

P55/R1191A-960

P55/R1192-961

P55/R1195-964

P50/R1197-966

P52/R1212-981

P55/R1229-997

D55/R1229A-998

P37/R1257-1026

D34/R1260-1029

D34/R1275-1043

D55/R1314-1078

P60/R1316-1080

P60/R1321-1085

D55/R1322-1086

P41/R1325-1089

P37/R1331-1095

P37/R1333-1097

P60/R1340-1104

D55/R1348-1112

D50/R1355-1119

P60/R1361-1125

P63/R1374-1139

D50/R1394-1158

P49A/R1396-1160

D55/R1401-1164

P37/R1416-1179

H80-1214

H81-1215

H85-1217

H106-1226

H106A-1227

H175-1261

H176-1262

H177-1263

H331-1317

H361-1326

H364-1330

H369-1332

H375-1333

H378-1334

H380-1335

H383-1337

Operating Manuals (cont.)

H401-1340
H421-1346
H428-1348
H462-1353
D50/PHR28-1373
G31/PHR55-1376

Operator-Training Equipment

H378-1334
H380-1335
H409-1342
H428-1348
H433-1350

Oscillators

D13/R344-216
G30/R606-447
P29/R1046-829

Overlapping Lobes

H25-1199

Overside-Noise Measurement

D53/R1068-851
D53/R1206-975
D53/R1258-1027

Overside Submarine Measurements

D53/R1078-858

Own-Doppler Nullifier

H112-1232
H120-1238
H124-1241
H136-1249
H486-1369

Painting

See: Hydrophones -- Painting

Parachute Packs

D16/R898-705

Parachutes -- AN/CRT-1A Buoys

D16/R1140-915

Parachutes -- Hemispherical

G2/R229-112

Pendulum Decelerometer

P18/R475-336

Pendulum Experiments

P38/R880-694

Pentodes -- Dynamic Characteristics

P35/R1179-947

Periscope Keyway-Cutting Fixture

P43/R1380-1144

Periscope Trainer

P41/R841-659
P41/R1325-1089
P41/R1420-1183

Periscopes

P43/P54/R1413-1176

Personnel Distribution

H268-1293
H275-1296

Personnel Roster

H468-1355
1371

Phase Detectors

P35/R1255-1024

Phase-Sensitivity Test Unit --

Bearing-Deviation Indicator
H278-1297

Phonograph Turntables

P37/R1016-801

Ping Transient

D57/R1152-927

Pinging

D44/R340-211

Plotting Devices

H131-1245

Polar-Chart Recorder

See: Portable Polar-Chart Recorder

Power Supplies

G30/R569-416

Power-Supply Filters

P24/R258-138
D24/R69-533

Power-Training Systems -- NL-125

D55/R967-762

Program Analysis
H268-1293
H275-1296

Program Repeater
D12B/R195-083

Projectile Rack
D23/R110-008

Projectiles -- 7-40-M
D29/R235-118
D29/R279-158
D29/R319-194
D29/D23/R327-202

Projectiles -- A/S
D28/R383-254

Projection Lamps -- Mazda
P35/R917-717

Projector Test Gear
H363-1328

Projectors
H115-1234

Projectors -- Artificial-Sonar
H350-1322
H361-1326
H474-1361

Projectors -- Bostwick
G13/R221-105
G13/R1305-1069

Projectors -- Crystal
G13/R1305-1069

Projectors -- Mk X
D52/R1250-1019

Projectors -- Pneumatic
D36/R183-76
D39/P464-326

Projectors -- Quadrant-Split
H420-1345

Projectors -- QC-JK
G13/A24A/R527-379
G27/R1412-1175

Projectors -- Recorder-Trace
P39/R711-541
P39/R813-634

Projectors -- WEA-1
G13/R175-070
D45/R331-204
G13/R339-210
D45/D40/R529-380

Propeller-Beat Generator
P48/R1399-1162

Propeller Cavitation
P32/R876-690

Propeller-Noise Discrimination Meter
P61/R1236-1005
P61/R1293-1058
P61/R1378-1142

Propeller Noise -- Measurements
G1/R322-197
G1/R335-207
P32/R896-703

Propeller-Shaft Howl -- Measurements
D53/R1134-909

Prospective Commanding Officer School
P44/R762-587

PRT Equipment
P21/R744-571

Pulley and Counterweight Cable -
Control System
G31/PHR 69-1380

QB Equipment
P55/R1115-891
P60/R1165-940
G31/PHR74-1382

QB Projector Cable System
G31/PHR70-1381

QC-BDI Rack
D20/R641-482
D20/R771-596

QC Driver Tuning
P29/R474-335

QC Monitor
H97-1221
H108-1230

QFD Advanced Bearing Teacher
H428-1348
H433-1350

QFF Primary-Listening Teacher
G42/PHR65-1378

QFL Amplifier Chassis
P21/R867-681

QFL Equipment
P21/R744-571

QH Sonar
H280-1299
H328-1315
H382-1338

Radar
P49A/R1389-1153
P49A/R1396-1160

Radio Equipment
D34/R1182-950
D34/R1183-951
D34/R1185-953

Radio-Range Tests
D16/R686-524

Radio-Receiving Equipment
D16/R144-041

Radio Sonobuoy Equipment
D16/R170-066

Radio Sono Buys -- Anchored
D3/R239-122
D3/R1311-1075

Range
P33/R617-458

Range and Bearing Indication
H105-1225

Range Keeper
D26/R505-361

Range Measurement
D50/R868-682
P28/R891-699-6

Range Scales
See also: Chemical Recorders --
Range Scale

Range Scales
D20/R277-156
D20/R289-165
D20/R452-315

Rapid Scanning
D44/R340-211

Reactance Tubes -- Frequency-Control
H223-1277

Receiver-Amplifier -- Model 755
P44/R607-507
P35/PHR 17-1372

Receivers -- Model 755
D17/R790-613

Receivers -- QBE
H128-1244

Receivers -- QC
H87-1218

Receivers -- RBY-1
G34A/PHR 67-1379

Receiving Racks -- Mk II D-20
D20/R395-264

Record Library
P37/R1273-1042

Recorder-Projector Assembly
P39/R1116-892

Recorder-Reproducer Set
P37/R1288-1055

Recorders
See also: Chemical Recorders

Recorders -- Automatic-Frequency
Response
P35/R671-511

Recorders -- Disc
P37/R1257-1026
P37/R1333-1097

Recorders -- Film
P37/R1233-1002

Recorders -- Operational-Bearing
H261-1290
H381-1336

Recorders -- Portable Polar-Chart
H481-1364

Recorders -- Range and Bearing
H97-1221

Recorders -- Sound-Range
D26/R310-186
D26/R486-346
D26/R498-356
P39/A24A/R589-436
D26/R634-475
D26/R672-512

Recorders -- Specifications
H215-1273
H215A-1274

Recorders -- Triple-Head
P37/P1298-1063

Recorders -- Type 73-A
P37/R1331-1095

Recorders -- Wire
P37/R656-497
D24/R658-499
P37/R809-630
D16/R995-786
D16/R996-787
D16/R1024-807
D16/R1048-831
D16/R1330-1094
P37/R1360-1124

Recorders -- Wiring Diagrams
H220-1276

Recordings and Training Records
P37/R487-347
D24/R591-438

Recordings -- Duplication
P37/R1272-1041

Recoverable Bomb
D27/R1098-875

Reduction-Gear Noise
D53/R1135-910

Relative-Bearing Animated Trainer
P47/R936-734
P47/R1013-798

Release Latch
D28/R511-366

Reports - Monthly and Biweekly
G34A/R105-1192-A-G34A/R706-1192-LL
G34A/R1377-1193
H1/1194-A-H1/1194-SSS
H1/1195-A-H1/1195-D
G34A/PHR35-1374-1389
G34A/PHR35-1391

Rerecording Facilities
P37/R1332-1096
P37/R1362-1127
P37/R1416-1179

Resistors
D22/D24/R153-050

Resonance Frequency -- Crystal
See: Crystal Resonance Frequency

Resonance Peaks
P33/R1053-836

Reverberation-Controlled Gain
H136-1249

Reverberation-Suppression Filter
H136-1249
H486-1369

Right-Left-Indicator
D51/D55/R845-661
D55/R899-706
D55/R916-716
G12/R947-744
D55/R958-755
D55/R970-763
D55/R989-780
D55/R1038-821
D55/R1074-856

Right-Left-Indicator (cont.)

D51/D55/R1085-865
D55/R1136-911
D55/R1144-919
D55/R1187-955
P35/R1265-1034
P35/R1297-1062
P35/R1386-1150
D51/D55/R1405-1168

RLI

See: Right-Left Indicator

Rocket Propellers

G10/R574-421

Roller Loaders

D49/R684-522

Rotating Test Unit

D34/R1286-1053

Rotoscope

H110-1231
H238-1283

Running Depth of Torpedoes

G10/R165-060

Salinity

P28/R1093-870

Salt-Water Corrosion

H210-1270

Scanning-Sonar System

H142-1252
H473-1360
H483-1366

Scatter Bomb

D49/R507-363
D49/R644-485

Scatter Charges

D49/R644-485
D49/R676-516
D49/R872-686

Schedules

H268-1293

Screening

D44/R296-172
D44/R424-289

Screening Equipment--Anchored Vessels

D44/R278-157

Seaboard Unit Replacement

G13/R596-443

Sea-Cell

P17/R180-74

Sea Markers

D16/R149-046

Sea Tests

G12/R581-428

Self-Noise Measurements

P60/R1346-1110

Seminar Afloat -- July 11, 1943

D20/R425-290
D16/R426-291
D41/R427-292
G12/R428-293
G13/R429-294
D38/R430-295

Ship Noise

H405-1341

Ship Spectra

D12/R1018-802

Ship-Speed Measurement

H471-1358

Sickles Coils

D44/R260-140

Signal Level

P33/R617-458

Signal-Reflecting Strength --
Measurement

H342-1320

Simultaneous-Lobe Comparison

D43/R247-129
H80-1214
H81-1215
H82-1216
H85-1217
H96-1220
H97-1221
H103-1224
H106-1226

Simultaneous-Lobe Comparison
(cont.)

H108-1228
H121-1239
H126-1243
H134-1248
H147-1256

Simultaneous-Lobe Comparison
for Azimuth (SLCA)

H30-1200
H41/H56-1203
H60-1207

Skip Distance

R112.54-013

Slip-Ring Assembly -- WCA-2

P60/R1340-1104
G31/PHR55-1376
G31/PHR70-1381
G31/PHR74-1382

Smoke Signals

D21/R719-548

Sonar Console

H314-1312

Sonar Domes

H302 (2)-1309
H482-1365

Sonar Doppler

H486-1369

Sonar Equipment

See also: Commutated-Rotation Sonar

Sonar Equipment

H453-1352
H464-1354

Sonar Equipment -- JP-1

D55/R989-780
D55/R998-789
P33/R1031-814
G12/R1251-1020

Sonar Equipment -- JT

D55/R1069-852
D55/R1221-990
D55/R1229-997
D55/R1229-A-998
D55/R1237-1006

Sonar Equipment -- JT (cont.)

D55/R1294-1059
D55/R1295-1060
D55/R1309-1073
D55/R1313-1077
D55/R1314-1078
D55/R1322-1086
G12/R1327-1091
D55/R1356-1120
D55/R1357-1121
D55/R1359-1123
D55/R1401-1164

Sonar Equipment -- Listening Ranges

P33/R1008-793

Sonar Equipment -- WCA-2

P60/R1100-877
P60/R1154-923
P60/R1340-1104
P60/R1346-1110
P60/R1361-1125
P60/R1369-1134

Sonar Gear

H364-1330

Sonar Instruction

P58/R950-747
P58/R1030-813
H365-1331

Sonar Portable-Testing Equipment

H383-1337

Sonar-Radar Training Barge

P63/R1414-1177

Sonar Research

H110-1231

Sonar Systems

H497-1221

Sonar-System Design

H302(2)-1309

Sonar System -- D55

D55/R962-758
D55/R963-759
D55/R965-760
D55/R966-761
D55/R967-762
D55/R970-763
D55/R998-789

Sonar System -- D55 (cont.)

D55/R1021-804-1
D55/R1038-821
D55/R1045-828
D55/R1114-890
D55/R1122-898
D55/R1129-904
D55/R1136-911
D55/R1139-914
D55/R1178-946
D55/R1204-973

Sonar Training

See: Sonar Instruction

Sonar Training Barge

P63/R1199-968

Sonic Amplifiers

See: Amplifiers -- Sonic

Sonic Detection of Torpedos

P60/R1081-861

Sonic Listening

G1/R151-048
D34/R321-196
G1/R333-205
G27/R351-223
D24/R360-232
D24/R368-238
D24/R373-243
D17/R432-297
D24/R526-378
D17/R534-385
G13/R613-454
P33/R1067-850
D55/R1187-955
P33/R1319-1083

Sonic Listening -- JP-1

D24/R552-401
D24/P30/R560-407
D24/R566-413
D24/R567-414
D24/R568-415
D24/R573-420
D38/R576-423
D38/R580-427
D24/R588-435
D24/R590-437
D24/R591-438
D24/R629-470
G12/R631-472
D24/R633-474

Sonic Listening -- JP-1 (cont.)

D24/R646-487
D24/R647-488
D24/R648-489
D24/R652-493
D24/R670-510
D24/R675-515
D24/R700-537
D24/R750-576
D24/R776-600
D24/R780-603
D24/R795-617
D24/R807-628
D24/R817-638
D24/R837-656
D24/R844-660
D55/R1045-828

Sonic-Listening Equipment -- Ranges

P33/R794-616
D24/D38/R726-555

Sonic-Locator Apparatus

H45-1204

Sonic Ranges -- Deep-Water

D16/R442-307

Sonobuoys -- Training Programs

D16/D34/R991-782
P52/R1036-819

Sound

See: Noise

Sound-Absorbing Coupler

D55/R965-760
D55/R1109-885

Sound Attenuation in Water

G1/R446-310

Sound Bells

D12/R352-224

Sound-Gear Monitor

H140-1250
H177-1263
H178-1265
H187-1266
H294-1305
H338-1318
H383-1337
H484-1367

Sound-Injector Training Aid
P48/R956-753
P48/R1302-1066

Sound Injectors
P48/R932-730
P48/R934-732
P48/R1033-816
P48/R1403-1166
P48/R1406-1169

Sound-Level Meter
G7/R478-339
P35/R1061-844
P55/R1133-908

Sound Measurements
D53/R866-680

Sound Measuring Equipment
D53/R714-544

Sound Meters
P42/R639-480

Sound Operators -- Training
H282-1300

Sound-Range Prediction
H200-1268

Sound-Receiving Equipment (JP-1)
P24/R540-390
P32/R893-701
P50/R919-720
D24/R1128-903

Sound Recording
P37/R1365-1130

Sound Reflection
G20/R749-575

Sound Test Box
D34/R1184-952

Sound-Transmission Test
G2/R112-010

Speakers -- 7/MC
D54/R849-665

Spectrum Scanner
D24/R931-729

Speech Inverters
G34A/PHR81-1386

Speed Halving Unit
A30/R961-757
A30/R978-770
A30/R1269-1038

Speed Tests
P32/P33/R812-633

Speedometers
See: Acoustic Marine Speedometer

Split-Projector Test Unit
H236/1282
H3311317
H363.5-1329

Squibb Latch
D23/R245-128

Submarine Acoustic-Reflecting
Strength
H342-1320

Submarine Conferences
H298-1308

Submarine Construction
D24/R723-552

Submarine Detection
P33/R1329-1093

Submarine Echo Ranging
P29/R1113-889

Submarine Gyro-Setting Indicator
Regulator
D53/R1307-1071

Submarine-Listening Equipment
G1/R138-036
D51/R544-394

Submarine Machinery Noise-Reduction
Program
D53/R1121-897

Submarine-Marker Buoys
D19/R1205-974

Submarine Noise
See also: Submarine Sound

Submarine Noise
G13/R221-105
P42/R645-486

Submarine Noise-Level Monitor
P55/R1106-883

Submarine-Noise Measurement
P42/R787-609
D53/R900-707
D53/R1264-1033
D53/R1282-1050
G34A/PHR35-1374

Submarine Noise -- Tests
D53.2/P42/R713-543

Submarine-Radar Training
P63/R1267-1036

Submarine Reduction Gears
D53/R1247-1016

Submarine-Sonar Equipment
G27/R814-635
D55/R824-645
D55/R825-646
D55/R826-647
D55/R828-650
D55/R836-655
P59/R1195-964

Submarine-Sonar Modification Equipment
D55/R939-736
D55/R940-737
D55/R944-741

Submarine-Sonar Systems
H359-1324
H369-1332

Submarine Sonar Training
G11/R1296-1061
G11/R1326-1090

Submarine Sound
See also: Submarine Noise

Submarine Sound
D16/R778-601
G42/R924-723

Submarine-Sound Equipment
P32/R608-449

Submarine-Sound Measurement
G1/R121-022

Submarine-Sound Operators
G42/R924-723

Submarine-Submergence Data
P33/R973-706

Submarine Tactical Systems
P44/R642-483

Submarine-Vibration Measurements
D53/R1264-1033
D53/R1282-1050

Submarine Warfare
P44/R672-587

Submarines
D24/D51/R728-557

Submarines -- Quick Dives
P33/R1371-1136

Subsight
D41/R174-069
D41/R186-077
D41/R191-081
D41/D26/R222-106
D41/R317-192
D41/R427-292
D41/R495-353
D41/R1430-1191

Subsurface Warfare
G20/R445-309

Supersonic Converters
D55/R1054-837

Supersonic Converters -- NL-115
D24/R657-498
D24/R603-503
P35/R673-513
D24/R781-604
D24/R782-605
D24/R783-606

Supersonic Converters -- NL-118A
D24/R892-700

Supersonic-Listening Channel
G30/R510-365

Supersonic Noise
P60/R1159-934

Supersonic-Underwater Signals
P33/R1277-1045

Supersonic Underwater Telephony
P32/R582-429

Surface-Craft Dispensers
D28/R140-038
D28/R1363-1128

Surface Self-Noise Measurement
P33/R1063-846
P33/R1385-1149

Synchro Switching Unit
P40/R1338-1102

Synchro-System Test Unit
A30/R1112-888
P26/R1270-1039

Tactical Bearing Recorder Teacher
P67/R1384-1148

Tactical Range-Recorder
P21/R533-384

Tactical Range Recorder Teacher
P21/R1235-1004
P37/R1336-1100
P21/R1402-1165

Tape-Loop Recorder - Reproducer
P37/R1334-1098

Tape Recorders
P37/R655-496
P37/751
D16/R997-788
P37/R1320-1084

Target-Discrimination Test
P61/R1383-1147

Target Doppler Indicator (TUI)
H486-1369

Temperature-Indicating Instruments
G7/R757-582

Test Equipment
A24A/R518-372

Tests
See
Acoustical Tests

Threshold-Comparison Tests
D16/R630-471

Through-the-Hull Listening
Equipment

D38/R125-026
D38/R155-052
D38/R219-103
D38/R369-239
D38/R374-244
D38/R390-261
D38/R410-276
D38/R430-295
D38/R869-683
D38/R1211-980
D22/D38/R1310-1074

Through-the-Hull Training Gear
D38/R21-150
D38/R690-528

Thuras Isolation Mount
D24/R750-576

Thyratron MTB
D20/D40/D45/R448-312
D40/R561-408
D40/R562-409
D40/R563-410
D40/R564-411
D40/R627-467
D40/R627A-468

Time-Varied Gain
H96-1220
H97-1221
H120-1238
H453-1352

Top-End Assemblies
D34/R1111-887
D34/R1160-935

Topside Sonic-Listening Equipment
D24/R123-024
D24/R232-115
D24/R233-116
D24/R303-179
D24/R314-190
D24/R382-253

Topside Sonic-Listening Equipment
(cont.)

D24/R411-277
D24/R417-283
D24/R573-420
D24/R590-437
D51/R593-440
D24/R609-450
D24/R626-466
G12/R1127-902

Topside Sonic-Listening
Equipment-- JP-1

D24/R729-558
D24/R736-564

Torpedo Attacks
G1/R492-351

Torpedo Data Computer-- Mk I
P40/R1361-A-1126

Torpedo Detection by Submarines
P60/R1043-826

Torpedo-Detection Modification

P60/R1316-1080
P60/R1321-1085
P60/R1361-1125
P60/R1369-1134
P60/R1427-1188

Torpedo-Detection Range
P60/R1126-901

Torpedo-Detector Modification
G34A/PHR53-1375
G31/PHR70-1381

Torpedo Detector Modification Dials
G31/PHR86-1387
G31/PHR87-1388
G34A/PHR91-1389

Torpedo Detectors
P20/R476-337
P20/R517-371
P20/R977-769
P20/R1050-833
P49A/R1313-1077

Torpedo-Noise Measurements
P20/R1022-805

Torpedo Tests
P20/R607-448

Torpedoes--Acoustically Controlled
G10/R918-718

Torpedoes--Direct Listening
D17/R565-412

Torpedoes--Sonic Detection
P20/R688-526

Towing Cables
G2/R238-121

Towing Units
D27/R227-110

Training Activities
G11/R1011-796
P63/R1414-1177

Training Equipment
H219-1275
H246-1286
H282-1300
H324-1314
H350-1322
H279-1298
G31/PHR69-1380

Training Manuals
G11/R913-713
P63/R1267-1036
P63/R1306-1070
P63/R1308-1072

Training Programs
D16/D34/R943-740
D55/R1356-1120
D55/R1357-1121
D55/R1359-1123
P60/R1369-1134
H289-1309
H429-1349

Training Programs-Entrance
Requirements
G42/PHR76-1386

Training Systems-JAA
D51/R1407-1170

Transcription Reproducers
P37/R1009-794

Transducer development
H75-1213
H107-1229

Transducers
G13/R775-580
P32/R766-591
G27/R1166-941
G12/R1418-1181

Transducers -- A-74
G27/R1119-895

Transducers--C-26
G12/R298-174
G13/R662-502
G13/R710-540

Transducers--Crystal
D41/R354-226

Transducers--GB 5-2
G12/R298-174

Transducers--JK Listening Tests
D17/R290-166
G13/R599-446

Transducers--Magnetostriiction
G12/R1117-893
G27/R1353-1117
H75/1213
H142.5-1253

Transducers-Piezoelectric
H75-1213

Transducers--QB
G27/R718-547
G27/R878-692
P32/R999-790

Transducers--QBF
G13/R599-446

Transducers - SGM Portable
H191-1267

Transducers - Sonar
H170-1260

Transformers
D55/R1074-856
D55/R1131-906
D55/R1148-923

Transformers -- Audio
P34/R1020-804

Transformers--D-126001
G7/R324-199

Transformers--EXP-180 and 181
D55/R1073-855

Transmission Survey
D12/R616-457

Transmissions Measurements
D12F/R822-643

Transmitters
D16/R182-75
D56/R1268-1037
H37-1202

Triangulation
D51/R571-418
D51/R575-422
D51/R622-463
D51/D55/R1085-865
H105-1225

Triangulation-Listening-Ranging
Equipment
D51/R1202-971
D51/R1246-1015
D51/R1303-1067
D51/R1343-1107
D51/R1404-1167
D51/R1422-1184
D51/R1429-1190

Triangulation-Listening-Ranging System
D51/R636-477
D51/R637-478
D51/R638-479
D51/R767-592
D51/R816-637
D51/R838-657

Triangulation-Listening-Ranging--Test sets
D51/R1279-1047

Triodes -- Grid-Current Effects
P35/R1179-947

Triplane Target
G37/R877-691
G37/R884-697

Triplane Tests
G37/A24A/R577-424

Tube Noise
G30/R454-317

Tubes -- Receiving
G21/R371-241

Tuning Tools
D34/R1185-953

Tuning Test Case
D34/R1182-950

Turntables--Transcription
D13/R396-265

Underwater-Electromagnetic Devices
G10/R129-028

Underwater-Impedance Measurements
H72-1211
H73-1212

Underwater-Listening Equipment
P33/R862-677

Underwater Loudspeaker
G13/R983-775

Underwater Projectiles
D10/R133-032

Underwater Sonic Loudspeaker
G13/R1352-1116

Underwater Sound
G1/G20/R262-142

Underwater-Sound Communication
D56/R1259-1028

Underwater-Sound Equipment
R6/R482-343
D24/R598-445
P33/R1253-1022

Underwater-Sound Gear -- Japanese
G1/R1060-843

Underwater-Sound Investigation
P33/R1379-1143

Underwater-Sound Measuring System
P35/R1138-913

Underwater-Sound Portable Testing
Equipment
H177-1263
H178-1265
H187-1266
H294-1305

Underwater Sound-Receiver Indicator
H228-1279

Underwater Sound Recordings
P37/R1367-1132

Underwater-Telephony
P28/R739-566

Underwater-Telephony Adapter
D56/PHR93-1390

Underwater Telephony System
D56/R1263-1032
D53/R1268-1037
D56/R1395-1159
D56/R1415-1178
D56/PHR75-1383
D56/PHR79-1385

Vector Impedance Locus Plotter
H99-1339

Velocity Characteristics
D10/R508-364

Vessels -- Hedgehog
D42/R308-184

Vibration Measurements
P42/R661-501
P42/R758-583

Vibration-Velocity Measurements
D53/R1207-976

Voltage Injectors
D34/R1183-951

Voltmeter
D50/R721-550

Voltmeters -- Vacuum-Tube

G30/R587-434
P35/R1261-1030
H294-1305
H338-1318

Water

See also: Acoustical Properties of Water

Water-Background Noise

H163-1258

Water Measurements

D46A/R364-235

Water Noise

G1/R300-176
G1/R361-233
P52/R945-742

Water-Noise Measurements

D12/R839-658

WCA Conversion Equipment

D55/R1163-938
D55/R1204-973
D55/R1209-978

WCA Sound Equipment

P32/R885-698
P55/P32/R887-699-1
P60/R1316-1080
P60/R1321-1085

WCA Training Equipment

P60/R1040-823
P60/R1315-1079

WCA Training Records

P60/R1143-918

WCA-Type Conversion Unit

D55/R1095-872

WCA-2 Echo-Ranging Systems

D57/R1287-1054
P49/R1313-1077

WCA-2 QB Driver

D57/R1400-1163

WEA-1

G13/R176-071
G13/R198-085
D20/D40/D45/R448-312
H101-1222
H118-1236
H118.5-1237

WEA-1 -- Acoustic Noise

D45.2/R325-200

WEA-1 -- Echo-Ranging Equipment

D45/D40/R529-380
D40/D45/R594-441

WEA-1 -- Equipment

D45/R716-546
D45/R772-597

WEA-1 -- MTB

D40/D45/R413-279
D45/D40/R416-282

WEA-1 -- QCU-Training Systems

D40/R561-408

Whale

See: Echo Repeaters -- Whale

Wide-Band Converters

P45/R724-553

Woods Hole Oceanographic Institution

G20/R415-281

Work Routines

A24/R443-308

AUTHOR INDEX

ALLEMAN, R. S.

D44/R516-370
D56/R715-545
P60/R1126-901
D57/R1152-927
P60/R1154-929
P60/R1159-934
D57/R1400-1163

ARCHER, G. W.

D16/R466-328
D24/R663-503
P35/R673-513
P35/R679-518
D34/R682-520
D16/R821-642
D16/R829-651
D34/R879-693
D34/R911-711
D34/R1032-815
D48/R1033-816
P35/R1138-913

ARNDT, W. F.

D20/R337-198
D20/R338-209
D20/R379-250
D20/R386-257
D43/D20/R392-263
P29/R474-335
D26/R498-356
A24A/R518-372
G37/A24A/R545-395
G37/A24A/R546-396
G37/A24A/R577-424
P39/A24A/R589-436
D51/R593-440
D51/R622-463
D51/R635-476
D51/R636-477
D51/R637-478
D51/R638-479
D26/R672-512
D51/R767-592
D51/R816-637
D51/R823-644
D55/R824-645
D55/R825-646
D55/R826-647
D55/R828-650

ARNDT, W. F. (cont)

D55/R916-716
D55/R939-736
D55/R940-737
G31/PHR58-1377
G42/PHR65-1378
G31/PHR70-1381
D56/PHR75-1383
D56/PHR79-1385

BARKSON, J. A.

D16/R182-75
D16/R365-236
D16/R377-247
D34/R378-249
D16/R471-332
D16/R506-362
D16/R592-439
D34/R632-473
D16/R685-523
D34/R747-573
D34/R774-598
D16/R811-632
D34/R851-667
D16/R898-705
D16/R920-721
P52/R1335-1099
P43/R1380-1144
P34/R1392-1156
P37/R1393-1157
P41/R1420-1183

BARRETT, L. R.

D55/R1027-810

BELL, M. E.

H15 - 1198

BERANEK, J. A.

D16/R243-126
D16/R250-131

BERNIER, H. F.

G27/R131-030
G12/R581-428
G12/R620-461
G12/R753-578
G12/R1014-799

BERRY, A. M

P32/R896-703
P60/R1126-901
D12/R1213-982
P33/R1371-1136
G27/R1412-1175

BINGHAM, T. W.

P44/R642-483
P44/R762-587
P29/R763-588

BLACHMAN, N. M.

H258-1289

BLOMQUIST, E. A.

D24/R628-469

BONER, C. P.

H117-1235
H118-1236
H120-1238

BUYERS, J. S.

D16/R995-786
D16/R996-787
D16/R997-787
D16/R1024-807
D16/R1048-831
P37/R1330-1094
P37/R1334-1098
P37/R1360-1124

BREEZE, G. E.

D10/R108-006
D29/R172-067
D29/R178-072
D29/R224-107
D29/R235-118
D29/R256-136
D10/R257-137
P17/R1328-1092

BROOKS, H.

H126-1243
H142.5-1253
H147-1256
H258-1289

BROWN, RICHARD L.

H72-1211
H73-1212

BUMBAUGH, H. L.

D16/R122-023
D13/R249-130

BUNDY, FRANCIS P.

H101-1222
H107-1229

BUSH, W. M.

D44/R260-140
D57/R1152-927
P60/R1154-929
D50/R1222-991

BUTZ, A. N.

H147-1256

CALLEN, R. J.

D20/R460-322
D26/R486-346
P29/A24A/R520-374
P29/A24A/R531-382
D20/R548-398
D55/R1038-821
D55/R1054-837
D55/R1074-856
D55/R1122-898
D55/R1136-911
D55/R1178-946

CARPENTER, T. H.

D16/R106-004
D16/R143-040
D16/D34/R462-324
D34/R107-853
D16/R1324-1088
D16/R1375-1140

CERNY, J. A.

D23/R110-008
D36/R183-076
D21/R220-104
G10/R226-109
D27/R227-110
D21/R228-111
D23/R244-127
D39/R464-326
D21/R465-327

CHAPMAN, R. Y.

D24/R201-087
D24/R232-115
D24/R314-190
D24/R360-232
D24/R373-243
D24/R552-401
D24/R588-435
D24/R618-459
D24/R629-470
D24/R670-510
D24/R723-552

CHERNOSKY, A. A.

H121-1239

CHIPMAN, L. E.

P35/R980-772
P35/R1179-947
P35/R1261-1030
P40/R1354-1118

CLEARWATERS, W. L.

D16/R381-252
D16/R778-601
D34/R1064-847
D16/R1140-915
D34/R1141-916
D34/R1162-937
D16/R1164-939
D16/R1186-954
D34/R1198-967
D34/R1210-979
D34/R1239-1008

COLE, A. R.

D54/R792-614
P35/PHR17-1372
G42/PHR65-1378
D56/PHR79-1385
D56/PHR93-1390

COLE, D. L.

D12/R839-658
D54/R854-670
D46A/R863-678
D38/R869-683
D24/R892-700
D12/R1018-802
P33/R1023-806
D46A/R1215-984
D50/R1222-991
D50/R1382-1146

CRAIN, H. M.

D55/R1348-1112

CUMMEROW, ROBERT L.

H101-1222

DAVIDSON, H. R.

H287-1302

DRISKE, B. B.

H150-1257

EDWARDS, P. B.

G12/R754-579
G12/R797-619
G12/R852-668
G12/R889-699-4
G12/R1168-943
G27/R1353-1117
G12/R1373-1138

ELLISON, J. V.

P33/R1277-1045
P65/R1345-1109

FELSING, W. A.

H124-1241
H128-1244
H141-1251
H147-1256

FINLAYSON, F. S.

G2/R229-112

FISH, P. E.

D16/R170-066
D16/R190-080
D16/R207-092
D16/R234-117
D16/R266-145
D16/R267-146
D16/R268-147
D16/R269-148

FISH, P. E. (cont)

D16/R270-149
D16/R272-151
D16/R273-152
D16/R388-259
D16/R403-270
D16/R764-589
D16/R768-593
D16/R778-601
D16/R1280-1048
D16/R1368-1133
D16/R1388-1152
D34/R1411-1174

FOLLIN, J. W.

G27/R130-029
G12/R456-319
G12/R570-417
G12/R743-570
D50/R858-682
G12/R928-726
D50/R930-728
G12/R947-744
G13/R988-775
G12/R1010-795
G12/R1342-1106
G12/R1418-1181
H234-1281

FOX, R. A.

D34/R137-035

FRITZ, W. H.

D44/R278-157
D44/R296-172
D25/R1240-1009

FULLERTON, D. P.

D10/D29/R111-009
D10/R118-019
P17/R180-074
D31/R240-123

GARDNER, J. B.

D22/D24/R153-050
G27/R1412-1175

GERJUOY, E.

G12/R101-000
G12/R166-061
G13/R175-070
G13/R176-071
G12/R208-093
G12/R236-119
D16/R261-141
G12/R298-174
D45.2/R325-200
G27/R353-225
D41/R354-226
G12/R408-274
G12/R439-304
G12/R459-321
D21/R463-325
D16/R466-328
D16/R472-333
D16/R496-354
P20/R517-371
D16/R536-387
D16/R537-388
G12/R547-397
D12/R554-403
D16/R555-404
D16/R578-425
G12/R579-426
G12/R583-430
G12/R597-444
D16/R610-451
D16/R612-453
G12/R619-460
G12/R643-484
G13/R662-502
G12/R664-504
G12/R683-521
D16/R689-527
G12/R691-591
D24/R720-549
D24/G12/R727-556
D16/R734-563
D34/R738-565
D16/R748-574
D24/R761-586
D51/R765-590
P29/R793-615
P33/R897-704
G10/R918-718

GERJUOY, E. (cont)

G12/R925-724
D51/R974-767
P33/R988-779
G10/R1028-811
G10/R1057-840
G10/R1058-841

GILBERT, F. E.

P29/R789-611

GILLETT, Glen D.

D20/R103-002
D20/R104-003
G10/R129-028
D40/R326-201
D40/D45/R413-279
D40/R760-585
P48/R932-730
P52/R945-742
P40/P52/R955-752
P48/R956-753
P40/R1147-922
P47/R1193-962
P40/R1227-995
P26/R1270-1039

GLENNAN, T. K.

G24/R411-277
D24/R441-306
A24/R443-308
D20/D40/D45/R448-312
D24/R609-450
G12/R733-562
D55/R836-655

GODBOLD, N. H.

H210-1270

GONGWER, C. A.

G2/R238-121
D34/R275-154
G17/G2/R434-299
D34/R515-369
G10/R574-421

GONGWER, C. A. (cont)

D42/R651-492
D24/R941-738
D24/R948-745
D55/R998-789
D55/R1139-914
D55/R1204-973
D55/R1205-974
P33/R1318-1082
D51/R1407-1170

GOURLEY, G. M.

D29/R279-158
D29/D23/R327-202
D49/R507-363
D49/R644-485
D49/R676-516
D49/R872-686
P63/R1199-968
P17/R1328-1092
P63/R1414-1177

GOYAN, F. M.

D24/R539-389
D26/R541-391
G12/R547-397

GRAF, V. V.

D56/R715-545

GRAHAM, W. F.

D38/R390-261
D38/R410-276
P33/R862-677
P33/R1031-814
P33/R1067-850
D31/R1311-1075
P33/R1347-1111
P33/R1379-1143

GRAY, D. E.

H234-1281
H279-1298
H294-1305

GRIFFIN, H. H.

D45/D40/R529-380

GRIFFIN, R. H.

G13/R198-085
D45/R331-204
G13/R339-210
D24/R566-413
D24/R567-414
G12/R596-443
D24/R700-537
D24/R795-617
D24/R817-638

HAEFNER, S. J.

D16/R431-296
G30/R510-365
P20/R517-371
G13/A24A-R527-37^a
G30/R535-386
G30/R569-416
P35/R653-494
P34/R855-671
P35/R870-684
D50/R910-710
D24/R931-729
P35/R984-776
P35/R1012-797
P33/R1053-836
D55/R1131-906
D55/R1148-923
P35/R1179-947
D55/R1252-1021
P35/A31/R1266-1035
G13/R1305-1069

HANCOCK, J. O.

G13/R198-085
G13/R339-210
H350-1322

HANDEL, N. E.

H246-1285
H282-1300
H324-1314

HANSON, R. O.

G29/R355-227
 D13/R396-265
 P37/R655-496
 P37/R656-497
 D54.2/P42/R796-618
 P37/R809-630
 P37/R1015-800
 P37/R1016-801
 P50/R1157-932
 P37/R1233-1002
 P37/R1256-1026
 P37/R1272-1041
 P37/R1273-1042
 P37/R1278-1046
 P37/R1288-1055
 P37/R1298-1063
 P37/R1299-1064
 D22/D38/R1310-1074
 P37/R1312-1076
 P37/R1320-1084
 P37/R1331-1095
 P37/R1332-1096
 P37/R1333-1097
 P37/R1334-1098
 P37/R1336-1100
 P37/R1362-1127
 P37/R1365-1130
 P37/R1367-1132
 P37/R1416-1179

HARDY, H.

H107-1229

HARLOW, H. E.

H296-1307

HARRIS, W. T.

G12/R450-313
 G7/R478-339
 D16/R555-404
 D16/R610-451
 G12/R691-529
 G12/R708-538
 G12/R746-572
 G12/R754-579
 G12/R779-602
 G12/R797-619
 G12/R804-625

HARRIS, W. T. (cont)

G12/R805-626
 D24/R827-648
 G12/R852-668
 G12/R858-674
 G12/R889-699-4
 G12/R929-727
 G12/R942-739
 G12/R1117-893
 G27/R1166-941
 G12/R1168-943
 G12/R1177-945
 G12/R1218-987
 D24/R1243-1012
 G12/R1248-1017
 P34/R1276-1044
 G12/R1284-1051
 G12/R1327-1091
 G27-R1353-1117
 G12/R1373-1138

HARRISON, M.

G1/R479-340
 D24/R750-576
 P34/R788-610
 D53/R882-696
 P33/R1149-924
 P55/R1203-972

HATHAWAY, J. L.

H87-1218
 H103-1224
 H105-1225
 H108-1228
 H117-1235
 H126-1243
 H128-1244

HAYNES, J. B.

D40/R406-272

HEBB, MALCOLM H.

H142.5-1253
 H147-1256

HERRNFELD, F. P.

D12B/R195-083
 G30/R213-098
 G12/D12/R216-100
 P35/R241-124
 J43/R247-129
 J44/R302-178
 G7/R324-199
 D38/R341-213
 J38/R342-214
 D24/R343-215
 D13/R344-216
 P35/R345-217
 J24/R346-218
 D24/R347-219
 G27/R351-223
 D12/R352-224
 G29/R355-227
 G27/R356-228
 D46A/R370-240
 G21/R371-241
 J12C/R512-367
 G30/R569-416
 D24/D38/R585-432
 D24/R598-445
 D24/R615-456
 D24/R621-462
 U24/R625-465
 D24/R663-503
 P35/R669-509
 D16/R686-524
 P35/R712-542
 D53/R714-544
 D24/R751-577
 P42/R770-595
 J56/R775-599
 D24/R781-604
 D24/R808-629
 D24/R819-640
 D50/R830-652
 D38/R869-683
 D50/R957-754
 D55/R958-755
 P34/R1020-804
 D55/R1073-855
 P35/R1138-913
 D24/R1238-1007
 D53/R1249-1018
 P35/R1265-1034
 P35/R1297-1062
 P55/R1323-1087
 P60/R1387-1151
 D56/R1395-1159
 P48/R1394-1162
 P35/R1428-1189

HOFF, H. B.

G1/R300-176
D12/R334-206
D12/R350-222
G1/R361-233
D46A/R470-331
G1/R479-340
D12/R616-457
P32/P33/R812-633
D12F/R822-643
D12/R839-658
D12/R856-672
P34/R860-676
D46A/R863-678
P55/P32/R887-699-1
P32/R893-701
P32/R896-703
P32/R946-743
P34/R993-784
D12/R1018-802
P33/R1023-806
P33/R1047-830
P33/R1063-846
D12A/R1118-893
P60/R1126-901
D12/R1213-982
P28/R1214-983
D46A/R1215-984
D50/R1222-991
D50/R1285-1052
P60/R1346-1110
P33/R1385-1149

HOOPER, L. J.

D10/R133-032
D29/R163-058
G2/R230-113
G2/R231-114
P18/R274-153
D21/R285-162
G2/R295-171
P18/R475-336

HORTON, J. W.

D20/R120-021
G20/R124-025
D41/R174-069
D41/R191-081
D26/R206-091
D41/D26/R22-106

HORTON, J. W. (cont)

D26/R309-185
D26/R310-186
G20/R445-309
G1/R446-310
P36/R504-360
D26/R505-361
D17/R565-412
P32/R582-429
P33/R617-458
D26/R634-475
P29/R1076-857
P29/R1113-889
D57/R1201-970
P36/R1262-1031
D57/R1287-1054
D56/R1415-1178
P60/R1427-1188

HOUSTON, C. E.

H294-1305

HUGO, O.

H350-1322

HULTGREN, H. I.

D20/R404-271
D20/R451-314
D20/R452-315
P40/R1227-995

HUNT, F. V.

H45-1204
H102-1223

JACOB, W. P.

P37/R1362-1127

JASPER, H. N.

D16/R189-079
D16/R218-102
D16/R305-181

JASPER, H. N. (cont)

D16/R306-182
D16/R311-187
D16/R376-246
D16/R381-252
D16/R400-268
D16/R832-649

JENKINS, W. L.

P21/R1402-1165

JEZIERSKI, E.

P33/R1371-1136

JOHNSON, M.

D46A/R532-383

JONES, M. B.

D16/R513-368
D16/R630-471
G27/R952-749
P52/R1029-812

KIRKLAND, R. E.

H223-1277

KITTREDGE, C. P.

D28/R140-038
D42/R169-065
D42/R200-086
D42/R212-097
D42/R251-132
D42/R308-184
D28/R383-254
D28/R511-366
D10/R740-567
P38/R880-694
P17/R1328-1092
D10/D29/R1351-1115
D28/R1363-1128
D28/R1364-1129

KLUMPH, G. B.	LAX, M.	LUCAS, J. C.
D16/R481-342	P34/R993-784	D55/R1356-1120
		D55/R1357-1121
KNAUSS, H. P.	LEWIS, R. V.	D55/R1359-1123
H110-1231	D16/R438-303	MACLAUGHLIN, R. R.
H132-1246		
H142-1252	LODA, C. J.	D16/R167-062
		D16/R315-191
KNUDSON, W. T.	D51/R519-373	D16/R433-298
P42/R759-584	D51/R1303-1067	D16/R440-305
D53/R900-707	D51/R1404-1167	D16/R466-328
P60/R1081-861		D16/R467-329
D55/R1150-925		D16/R468-330
P55/R1220-989	LOYE, D. P.	D16/R473-334
D53/R1247-1016		D34/R477-338
D53/R1264-1033	G1/R113-014	D16/R496-354
	G1/R138-036	D16/R497-355
KREBS, L. E.	P12/R145-042	D34/D16/R523-376
P44/R642-483	D24/D38/R150-047	D34/R525-377
	G1/R151-048	G12/R530-381
	G1/R300-176	D16/R536-387
	G1/R322-197	D16/R537-388
	G1/R335-207	D16/R578-425
KROENERT, J. T.	D24/R360-232	D16/R610-451
G30/R587-434	G1/R361-233	D16/R685-523
G30/R606-447	D24/R368-238	D16/R689-527
P44/R667-507	D24/D38/R391-262	D16/R734-563
P45/R274-553	G13/R599-446	D16/R748-574
D20/R771-596	P42/R639-480	G12/R754-579
D17/R790-613	P35/R640-481	P35/R757-582
P44/R865-679	P42/R645-486	D16/R798-620
P21/R867-681	P42/R650-491	D16/R799-621
P35/R1138-913	P42/R661-501	D16/R800-622
P21/R1235-1004	P42/R758-583	D16/R801-623
D55/R1237-1006	D53/R866-680	D16/R802-624
D24/R1238-1007	D53/R874-688	G12/R805-626
D51/R1279-1047	D53/R895-702	D24/R827-648
	P32/R896-703	D16/R832-649
	D53/R926-725	D16/R831-653
	D53/R1034-817	P33/R949-746
LANE, H. M.	D53/R1059-842	P33/R973-766
H121-1239	D53/R1068-851	D34/R990-781
	D53/R1091-868	D34/R1097-874
	D53/R1121-897	D16/R1101-878
	D53/R1151-926	D24/R1102-879
LARSON, R. D.	D53/R1207-976	D16/R1103-880
D38/R576-423	D54/R1290-1056	D16/R1104-881
G11/R1326-1090		D16/R1105-882
D55/R1357-1121		D34/R1223-992
		D16/R1224-993
		D34/R1225-994
		G12/R1230-999
		D34/R1241-1010

MANINGER, R. C.

G12/R101-000
G1/R121-022
G12/R166-061
D34/R292-168
G1/R300-176
D34/R330-203
D34/R336-208
D34/R349-221
G1/R361-233
D34/R372-242
D38/R374-244
D34/R375-245
D24/D38/R391-262
D22/D24/D38/R455-318
D16/R472-333
G1/R494-352
D17/R543-393
G12/R581-428
P42/R759-584
P33/R794-616
P33/R862-677
D53/R882-696
G1/R1060-843
P33/R1067-850
P33/R1149-924
P34/R1244-1013
P33/R1319-1083
P33/R1409-1172

MANN, H. J.

D46A/R532-383

MARKHAM, J. J.

G13/R221-105
G20/R415-281
G1/R437-302
G1/R438-344
P28/R485-345
D12/R616-457
P28/R739-566
D12F/R822-643
P28/R891-699-6
P32/R893-701
D50/R1049-832
G1/R1196-965
P28/R1214-983
P28/R1231-1000
G12/R1254-1023
D56/R1263-1032

MARTIN, G. W.

D10/R108-006
D23/R245-128
D10/D29/R287-163
D29/R319-194

MASON, R. I.

D16/R106-004
D16/G10/R196-084
D16/R293-169
D16/R320-195
D34/R321-196
D34/R414-280
D16/R489-349
D16/R490-350
D16/R503-359
D34/R553-402
D16/R835-654
D34/R1180-948
D34/R1188-956
D34/R1217-986
D34/R1234-1003
D34/R1311-1075

MCGEENEY, J. J.

D20/R264-143
D20/R265-144

MILLER, L. N.

H54-1206
H107/1229

MODE, D. E.

D50/R1026-809
P29/R1046-829
D54/R1072-854
P35/R1255-1024
P35/R1265-1034
D56/R1268-1037
P35/R1386-1150

MORRICAL, K. C.

H118-1236

MORTON, R. C.

H320-1313

MURPHY, R.

D16/R480-341
D16/R502-358

NAT'L BUREAU OF
STANDARDS, INTERSERVICE
RADIO PROPAGATION LAB

R112.54-011
R112.54-012
R112.54-013
R115.5-016

NEFF, W. D.

D16/D34/R107-005
D16/R122-023
D16/R156-053
D16/R297-173
D16/R362-234
P58/R1030-813
G11/R1296-1061

NOLLE, A. W.

H90-1219
H120-1238
H124-1241

NOSKER, L. W.

G1/R437-302
D51/R838-657
D51/D55/R1085-865
D51/R1422-1184

NOYES, E. E.

D10/R108-006
D23/R135-033
D36/R146-043
D42/R409-275

NUNAN, J. K.

D51/R519-373
D51/R544-394
D51/R575-422
D51/R593-440
D24/R646-487
P29/R789-611
G27/R814-635
D53/R846-662
D53/R888-699-3

ORDING, J. R.

D50/R1285-1052
D50/R1337-1101
D50/R1382-1146

OSGOOD, S. W.

P61/R1378-1142
P61/R1383-1147

PAN, J. T.

H234-1281
H264-1292

PELLAM, J. R.

H72-1211
H73-1212

PERINE, W.

D35/R254-134
D24/R1350-1114

PERRY, G. R.

P28/R1093-870
P28/R1214-983
D50/R1222-991
P28/R1231-1000
P33/R1317-1081
D50/R1382-1146
P28/R1398-1161

PETIT, F. W.

D41/R412-278
A30/R1112-888
A30/R1120-896
A30/R1269-1038

PRATT, R. W.

D53/R874-688
D53/R895-702
D53/R1042-825
P55/R1056-839
P55/R1065-848
D53/R1134-909
P55/R1220-989
D53/R1258-1027
D53/R1264-1033

PROUDFOOT, D. A.

D12/R109-007
D12/R119-020
G1/R121-022
G10/R165-060
D12/R215-099
D12/R307-183
D46A/R358-230
D12/R453-316
D46A/R470-331
P20/R559-406
P20/R607-448
P20/R666-506
P20/R688-526
D54/R806-627
D54/R849-665
D54/R933-731
D54/R992-783
D53/R1055-838
D53/R1059-842
P60/R1081-861
D53/R1121-897
D53/R1206-975
P20/R1216-985
D53/R1247-1016
D54/R1290-1056

QUEST, K. G.

G12/G7/R447-311
G30/R454-317

RECORDING DEPT.

P37/R487-347

REED, F. C.

D41/R495-353
D55/R1144-919
D55/R1366-1131
D51/R1372-1137
D51/D55/R1405-1168
D41/R1430-1191

REISEL, E. L.

G31/PHR69-1380
G31/PHR74-1382

REYNOLDS, A. T.

D50/R721-550
D51/R929-711
D56/R953-750
G12/R959-756
P38/R1304-1068
P35/R1381-1145

RHEA, D. O.

D21/R649-490
D21/R719-548
D21/R951-748
D21/R1232-1001

RICHT, R. R.

G31/PHR86-1387
G31/PHR87-1388

RIPKEN, J. F.

D16/R164-059
D10/R508-364
D16/R994-785
D16/R1025-808
D16/R1044-827
D34/R1083-863
D34/R1111-887
D34/R1160-935
D34/R1370-1135

ROCKWELL, G. O.

D31/R116-017
D23/R135-033
P17/R194-082
G10/G15/R202-088
D50/P19/R436-301
D49/R507-363
D49/R644-485
D50/R668-508
D49/R676-516
D49/R684-522
D49/R725-554
D50/R730-559
D50/R873-687
D48/R1189-957
D52/R1250-1019
D50/R1285-1052
D50/R1337-1101
G12/R1342-1106
P26/R1358-1122

RODELIUS, N. W.

P47/R1193-962
P40/R1227-995

RODGER, M. T.

D24/R633-474
D241/R647-488
D24/R648-489
D24/R658-499
D24/R751-577
D24/R781-604
D24/R782-605
D24/R783-606
D24/R784-607
D53/R866-680
D56/PHR93-1390

RODMAN, I. P.

H108-1230
H112-1232

ROSS, B. M.

P48/R1406-1169

RUSSELL, V. P.

P33/R1371-1136

RUTHERFORD, C. R.

H117-1235
H128-1244
H279-1298
H307-1311

SAARS, W. F.

P50/R1157-932
P37/R1331-1095
P37/R1367-1132

SABINE, P. E.

H107-1229

SAUNDERS, N. B.

H261-1290

SAWYER, C. R.

D20/D43/R399-267
D45/D40/R416-282
D24/R526-378
D24/P30/R560-407
D40/R562-409
D40/R563-410
D40/R564-411
D51/R571-418
D24/D51/R728-557
D24/R848/664
D55/R899-706
D55/R998-789
D55/R1069-852
D55/R1095-872
D55/R1163-938
D55/R1204-973
D55/R1209-978
D51/R1246-1015
G12/R1342-1106
D51/R1429-1190

SAWYER, O. E.

D40/R760-585
D55/R824-645
D55/R825-646
D55/R826-647
D55/R828-650
D55/R1045-828
D55/R1114-890
D55/R1129-904
D55/R1294-1059
D55/R1309-1073

SCHAFFER, W. G.

P26/R1270-1039
P40/R1361-1126

SCHELL, F. T.

P60/R1040-823
P60/R1315-1079
P60/R1346-1110
P60/R1427-1188

SCHUCK, O. H.

H15-1198
H81-1215
H103-1224
H108-1228
H108-1230
H115-1234
H118-1236
H120-1238
H121-1239
H126-1243
H134-1248
H141-1251
H145-1255
H236-1282
H320-1313
H331-1317
H350-1322

SCHULZE, R. C. R.

P55/R1050-839
D53/R1135-910

SCOTT, R. M.

H142-1252

SEBRING, P. B.

H114-1233

SEELEY, E. S.

G17/R139-037

D41/R186-077

D41/R317-192

G13/R339-210

D44/R340-211

G1/R492-351

D45/R716-546

SETTERHOLM, V. M.

D36/R146-043

D23/R380-251

D21/R719-548

G37/R884-697

SHAFFER, W. G.

D23/R132-031

D20/R395-264

D40/R551-400

SHEA, T. E.

G12/R1342-1106

SHERWOOD, D. M.

P44/R642-483

P44/R762-587

P29/R763-588

D24/R807-628

SMITH, F. H.

H118-1236

H131-1245

H320-1313

SMITH, K. R.

P58/R1030-813

G42/PHR76-1384

SMITH, N.

R1155-016

SNOW, W. B.

D16/D34/R107-005

D38/R125-026

D16/R152-049

D12E/R173-068

D24/D38/R217-101

G1/R242-125

D24/R252-133

G1/G20/R262-142

G1/R288-164

D24/R303-179

D34/R348-220

G12/R357-229

D24/R382-253

P20/R387-258

G1/R407-273

D16/R422-288

D22/D24/R435-300

D16/R442-307

P20/R476-337

P20/R501-357

D24/R586-433

P32/R608-449

D12/R616-457

P20/R688-526

G10/R731-560

D24/R732-561

G20/R741-568

P21/R744-571

G20/R749-575

P32/R766-591

P29/R793-615

P32/P33/R812-633

G27/R814-635

D12F/R822-643

P32/R876-690

P32/R885-698

P55/P32/R887-699-1

G27/R888-699-2

P32/R893-701

G42/R924-723

P32/R946-743

G27/R952-749

SNOW, W. B. (cont)

P37-751

P20/R977-769

P32/R999-790

P33/R1023-806

D38/R1039-822

P33/R1047-830

P20/R1050-833

G1/R1060-843

P35/R1061-844

P55/R1062-845

P33/R1063-846

P55/R1106-883

P55/R1115-891

P33/R1123-899

D50/R1146-921

P55/R1153-928

D53/R1155-930

D12/R1213-982

P20/R1216-985

D50/R1245-1014

D53/R1249-1018

P55/R1281-1049

D53/R1311-1075

P33/R1329-1093

D50/R1337-1101

G12/R1342-1106

P33/R1385-1149

G12/R1417-1180

G12/R1418-1181

G12/R1419-1182

P35/R1428-1189

STEDMAN, CECIL K.

H10-1197

H15-1198

H25-1199

STEPHENSON, R. G.

D20/R277-156

D20/R289-165

D20/R312-188

D20/R313-189

D41/R495-353

D51/D55/R1085-865

D51/R1242-1011

D51/R1343-1107

D51/R1422-1184

D41/R1430-1191

STRADLING, L. J.

D55/R1150-925
D53/R1151-926
D53/R1247-1016

SUTER, H.

D16/R389-260
D16/R458-320
D16/R542-392
D16/R660-500
D16/R798-620
D16/R885-699
D16/R907-708
D16/R1082-862
D16/R1145-920
D16/R1158-933
D16/R1194-963
D16/R1208-977
D16/R1219-988

TATUM, A. K.

P17/R290-166
G1/R300-176
D17/R304-180
G1/R361-233
D17/R367-237
D24/R368-238
D12C/R512-367
G13/R599-446
G13/R613-454
P35/R671-511
G37/R884-697
P33/R890-699-5

TEAL, E. E.

D38/R155-052
D38/R219-103
G13/R221-105
D24/D38/R301-177
G1/R333-205
D38/R369-239
P20/R517-371
D17/R534-385
D38/R576-423
D38/R580-427
D24/D38/R726-555
D54/R849-665
D54/R933-731

TEAL, E. E. (cont)

P20/R977-769
D54/R992-783
P20/R1022-805
D53/R1042-825
P20/R1050-833
D53/R1055-838
D53/R1206-975
D38/R1211-980
P20/R1216-985
D53/R1211-980
P20/R1216-985
D53/R1247-1016
D54/R1290-1056
D53/R1307-1071
D22/D38/R1310-1074

THOMPSON, W. S.

H142-1252

THURAS, A. L.

G12/R158-055
D17/R432-297
G12/R488-348
G12/R581-428
G12/R620-461
G12/R631-472
G12/R853-669
G12/R928-726
G27/R1119-895
G12/R1125-900
G12/R1127-902
G12/R1137-912
P33/R1161-936
G12/R1251-1020
D56/R1259-1028
G13/R1352-1116

THURLOW, W. R.

G42/PHR76-1384

TRAINING GROUP

P52/R1036-819

VAN LENNEP, D. W.

G12/R662-502
D16/R689-527
G12/R709-539
G27/R718-547
P42/R722-551
D16/R734-563
D16/R748-574
G12/R797-619
D16/R798-620
D16/R799-621
D16/R800-622
D16/R801-623
D16/R802-624
G12/R805-626
D24/R827-648
D16/R831-653
G12/R852-668
G12/R858-674
G27/R878-692
G12/R889-699-4
G12/R914-714
G12/R915-715
G12/R929-727
D34/R1097-874
D16/R1101-878
D24/R1102-879
D16/R1103-880
D16/R1104-881
D16/R1105-882
D50/R1110-886
G12/R1117-893
G27/R1166-941
G12/R1168-943
G12/R1177-945
G12/R1218-987
D34/R1223-992
D16/R1224-993
D34/R1225-994
D34/R1241-1010
D24/R1243-1012
P34/R1244-1013
D53/R1271-1040
G12/R1284-1051
G12/R1327-1091
G12/R1342-1106
G27/R1353-1117
G12/R1408-1171

WAGER, R. A.

D12B/R115-015
D12B/R294-170
D12/R334-206
D46/R364-235
D46/R532-383
P42/R650-491
P42/R661-501
D53.2/P42/R713-543
P42/R758-583
P42/R787-609
D53/R810-631
D53/R850-666
D46A/R863-678
D53/R874-688
D53/R926-725
D53/R1034-817
P55/R1052-835
P55/R1066-849
D53/R1068-851
D53/R1078-858
D53/R1135-910
D46A/R1215-984
D53/R1258-1027
D53/R1264-1033
D53/R1282-1050
D16/R1344-1108

WALTON, C. E.

P39/R711-541

WAMBACH, A. G.

D16/R318-193

WATKINS, W. B.

P37/R1233-1002
P37/R1257-1026
P37/R1278-1046
P37/R1299-1064
P37/R1333-1097

WATSON, R. B.

H215-1273
H215a-1274
H220-1276
H287-1302

WATT, J. P.

H236-1282
H331-1317

WESTEVELT, R. A.

H307-1311

WESTNEAT, A. S.

P35/R418-284
D20/R641-482
D24/R652-493
D16/R681-519
D16/R687-525
D24/R751-577
D16/R756-581
D53.2/P42/R785-608
P34/R855-671
P35/R871-685
P35/R917-717
P35/R1012-797
P40/R1338-1102
P63/R1339-1103

WHANNEL, R. L.

D24/R815-636

WHITE, D. C.

G1/R483-344
P28/R485-345
D24/R568-415
D24/R657-498
D24/R675-515
D24/R729-558
D24/R736-564
D24/R776-600
D24/R780-603
D24/R820-641
D24/R844-660

WILDING PICTURE PRODUCTIONS, INC.

P52/R1041-824

WILLIAMS, H. C.

D24/R360-232
D24/R368-238
D24/R540-390
D24/R550-399

WOODWARD, L. A.

P33/R1008-793
P33/R1253-1022
G12/R1301-1065
P63/R1374-1139

WOOTEN, B. A.

H261-1290
H264-1292
H287-1302
H294-1305
H296-1307

WORCESTER POLYTECH.
INST., AERONAUTICS LAB.

G2/R229-112
G2/R230-113
G2/R231-114
P18/R475-336

WORCESTER POLYTECH.
INST., ALDEN HYDRAULIC LAB.

G2/R295-171

ZERN, R. T.

P52/R1037-820
P61/R1236-1005
P61/R1293-1058
P48/R1302-1066



()



VESSEL INDEX*

AMADA

G1/R151-048
G13/R221-105
D34/R349-221
D34/R375-245
G1/R407-273
G13/R429-294
G1/R494-352
D17/R542-392
P33/R1379-1143

BILLIE B.

G37/A24A/R546-396

CGR 1985

D38/R155-052
G13/R221-105
D38/R576-423
D38/R580-427

BARGE

G12/R428-293
G12/R439-304
G12/R459-321
D16/R472-333
G7/R478-339
G12/R547-397
D16/R555-404
G12/R579-426
G12/R583-430
G12/R1597-444
G12/R619-460
G12/R643-484
G13/R662-502
G12/R664-504
G12/R683-521
G12/R709-539
G13/R710-540
G12/R718-547
D16/R748-574
P42/R787-609
D16/R801-623
D16/R802-624
G12/R914-714
D16/R1101-878
D16/R1104-881
D16/R1105-882
D50/R1110-886
P50/R1157-932
D34/R1223-992
G12/R1408-1171

CGR 3080

D38/R410-176

CGR VALOR

D38/R430-295
P62/R1358-1122

COLORADO (tanker) (45)

P20/R607-448

DE157

D16/R818-639

DE180

D16/R818-639

EAGLE BOAT (PE-55)

G1/R138-036

*The following references were consulted while preparing this list: Jane's Fighting Ships, 1942 - 1945, ed. F. E. McMurtie, (NY: MacMillan Co., 1943 - 1947) and Dictionary of American Naval Fighting Ships, ed. James L. Mooney (Vols. I-VIII): Washington: Naval Historical Center, Department of the Navy: 1959 - 1981).

ELCOBEL (BELL TELEPHONE
LABORATORY)

P33/R862-677

HEDGEHOG

D42/R169-065
D42/R200-086
D42/R308-184
D52/R1250-1019

USCGC MADALAN

D38/R369-239
D38/R390-261

USS ANGLER (SS-240)

D24/R588-435
D24/R628-469

USS ARCHERFISH (SS-311)

D24/R566-413

USS BALAO (SS-285)

D24/R314-190
G1/R322-197
G1/R333-205
G1/R335-207
R32/R896-703
D55/R1204-973

USS BANG (SS-385)

D24/R700-537
D24/R780-603
D54/R992-783

USS BARBEL (SS-316)

D53/R810-631
D54/R849-665
D53/R895-702

USS BARBERO (SS-317)

D53/R895-702
P32/R946-743

USS BARNEGAT (AVP10)

H118-1236
H118.5-1237

USS BAYA (SS-318)

P33/R1031-814

USS BECUNA (SS-319)

D54/R992-783

USS BESUGO (SS-321)

P55/R1052-835
D53/R1055-838
P55/R1056-839
P55/R1062-845
P33/R1063-846
P55/R1066-849
P35/PHR17-1372

USS BLACKFIN (SS-322)

D53/R1042-825

USS BLENNY (SS-324)

D53/R1135-910

USS BLUEBACK (SS-222)

G12/R1127-902
D53/R1194-909
P33/R1161-936

USS BLUEGILL (SS-242)

P42/R661-501
D24/R675-515
D24/R736-564
D24/R776-600

USS BOARFISH (SS-327)

P55/R1203-972
P55/R1220-939
P33/R1385-1149
G31/PHR69-1380
G31/PHR70-1381

USS BOWFIN (SS-287)

D55/R1204-973

USS BRANNAN (DE13)

D42/R212-097

USS BREAM (SS-243)

D24/R736-564
P42/R758-583
D24/R780-603
D54/R792-614
D54.2/P42/R796-618
D54/R854-670

USS BURRFISH (SS-312)

D24/R567-414

USS CAIMAN (SS-323)

P33/R1063-846
P60/R1126-901
P60/R1315-1079
P60/R1346-1110
G34A/PHR53-1375

USS CAVALLA (SS-244)

D24/R815-636
D54/R854-670
P55/P32/R887-699-1
P33/R1123-899

USS CHUBB (SS-329)

D53/R1206-975
D53/R1207-976

USS COD (SS-224)

D16/R438-303

USS CONGER (SS-477)

D51/R1303-1067
D51/R1404-1167
D51/R1422-1184
D51/R1429-1190

USS CORVINA (SS-226)

D24/R526-378

USS CYTHERA (PY31)

H328-1315
H382-1338

USS DOLPHIN (SS-169)

P60/R1081-861

USS DORADO (SS-248)

D24/R628-469

USS EAGLE 38

D20/R337-198
D20/R338-209
D20/R386-257
D20/R40/R420-286
D20/D40/R595-442

USS EUHAW (IX85)

D46A/R358-230

USS FLASHER (SS-249)

D24/R568-415

USS GABILAN (SS-252)

P42/R661-501
D53.2/P42/R713-543
D24/R780-603
D53/R866-680
P32/R946-743
D24/R1243-1012

USS GALAXY (IX54)

G1/R121-022
H60-1207
H70-1210
H136-1249

USS GATO (SS-212)

D55/R1204-973

USS HACKLEBACK (SS-295)

D53/R1258-1027

USS HARDER (SS-257)

D16/R320-195

USS HARDHEAD (SS-365)

D53-R926-725

USS HOE (SS-258)

D24/R621-462

USS JORDAN (DE204)

D16/R1388-1152

USS LIONFISH (SS-298)

D56/PHR93-1390

USS LUSTER (IX82)

D46A/R358-230

USS MACKEREL (SS-204)

D55/R989-780

USS MARABOUT (AMc50)

P63/R1374-1139

USS MARTHA'S VINEYARD (IX97)

G1/R333-205
D41/R427-292
P29/A24A/R520-374
D56/R775-599

USS NIELDS (DD616)

H117-1235

USS ORDRONAU (DD617)

H120-1238

USS PC-451

D20/R395-264
D20/D40/R419-285
D40/R551-400
D20/D40/R611-452

USS PERCH (SS-313)

D24/R736-564
P42/R759-584
D24/R780-603
D54/R992-783

USS PERMIT (SS-178)

D24/R201-087
U24/R232-115

USS PICKEREL (SS-524)

D24/R201-087
D24/R232-115

USS PIPER (SS-409)

D56/PHR75-1383

USS POMPAÑO (SS-491)

D24/R201-087
D24/R232-115

USS PRUITT (DD347)

D56/PHR93-1390

USS PUFFER (SS-268)

D55/R1204-973

USS QUEENFISH (SS-393)

P34/R993-784
P33/R1371-1136

USS R-14

G1/R300-176

USS RELIANCE (CG150)

G31/PHR58-1377

USS ROMAIN (IX89)

D46A/R358-230

USS S-16 (SS-121)

D24/R373-245
D34/R375-245

USS S-20 (SS-125)

D41/R186-077
D17/R304-180
D34/R336-208
D34/R349-221
D17/R367-237
D24/R368-238

USS S-48 (SS-159)

D51/R637-478
P29/R789-611
D24/R807-628
D53/R882-696
D53/R888-699-3
D51/D55/R1085-865
D51/R1246-1015
D53/R1264-1033
D51/R1303-1067
D51/R1407-1170
D51/R1429-1190

USS SALUDA (IX87)

D46A/R358-230
D46A/R364-235
D46A/R863-678

USS SARDONYX (PYc12)

D44/R424-289
P28/R485-345
P29/A24A/R531-382
D20/R548-398
D40/R564-411
D56/R775-599
P29/R789-611
H245-1285

USS SARGO (SS-188)

D24/R1243-1012

USS SC-630

D45/D40/R529-380

USS SC-665

D41/R186-077
D42/R200-085
D45/D40/R416-282
D40/R561-408
D49/R872-686

USS SEA FOX (SS-402)

P55/R1056-839
P55/R1062-845
P33/R1063-846
P60/R1346-1110
P35/PHR17-1372

USS SEA LION (SS-315)

P29/R763-588
P42/R770-595
D54/R806-627
D24/R817-638
P55/P32/R887-699-1
P32/R893-701
D54/R992-783

USS SEMMES (DD189)

D17/R290-166
D17/R304-180
G13/A24A/R527-379
D40/R563-410
G13/R613-454
D16/R818-639
P38/R880-694
H133-1247
H136-1249

USS SHARK (SS-314)

P29/R763-588
D24/R780-603
D17/R790-613
D24/R807-628
P32/P33/R812-633
D54/R992-783

USS SPEARFISH (SS-190)

D55/R1204-973

USS SPIKEFISH (SS-404)

D53/R1151-926

USS SPRINGER (SS-414)

D55/R1204-973

USS STERLET (SS-393)

D56/PHR75-1383

USS STURGEON (SS-187)

D55/R1204-973

USS SYLPH (PY12)

D20/R425-290
D20/R451-314
H253-1288
H391-1336

USS TARPON (SS-175)

P33/R1023-806

USS TAUTOG (SS-199)

D55/R1204-973

USS THORNBAC (SS-418)

D55/R1095-872
D55/R1114-890
D55/R1129-904

USS TINOSA (SS-283)

D55/R1204-973
G31/PHR74-1382

USS TUNNY (SS-282)

D55/R1204-973

USS YP-252

P20/R977-769

USS YP-253

D55/R1366-1131
D51/R1372-1137

YNG-22

P63/R1308-1072

END

FILMED

3

-86

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